

JPRS 79415

10 November 1981

USSR Report

CONSTRUCTION AND EQUIPMENT

No. 50



FOREIGN BROADCAST INFORMATION SERVICE

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CONSTRUCTION

USSR MINISTER OF CONSTRUCTION REVIEWS RESULTS FOR FIRST HALF OF 1981

Moscow IZVESTIYA in Russian 8 Aug 81 p 2

[Article by G. Karavayev, USSR Minister of Construction: "Build Economically and with Good Quality"]

[Text] Our capital construction has become the most resources-intensive branch of the economy: more than a fifth of the country's income is spent on it. During the 10th Five-Year Plan alone capital investment in the national economy was 634 billion rubles. However, construction not only takes a lot, it gives a lot. During the past 5 years the country's fixed capital increased 1.4-fold. More than 1,200 large industrial enterprises were put into operation in the national economy. More than 50 million people celebrated housewarmings in new housing, which totaled 530 million square meters in area. Many schools, hospitals and facilities for cultural and domestic-amenity purposes were built.

Still more important tasks have been assigned to the builders for the 11th Five-Year Plan. As Comrade L. I. Brezhnev noted at the 26th CPSU Congress, this five-year plan will be a serious test of the builders. Its characteristic feature is the concentration in every possible way of efforts to complete and start up as quickly as possible those enterprises that are capable of providing for the greatest increase in output and to clear out bottlenecks. Capital investment that exceeds the funds invested during the 10th Five-Year Plan by 12-15 percent is now to be assimilated. It will be necessary to build housing that totals 530-540 million square meters in area, it being required, and this is important to emphasize, to solve the task on a new engineering basis, radically improving construction itself and constantly raising capital-investment effectiveness.

Our industry's workers are greeting their vocational holiday--Builders' Day. In evaluating what has been completed during the first step of the five-year period, it can be said: much has been done, but more remains to be done. The work results of the first half of the year indicate that definite positive shifts are occurring in branches of the construction industry. Fixed capital costing about 31 billion rubles was put into operation through state capital investment. This is 4 percent more than in the first half of last year.

USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises] turned over to clients during the first half of the year a specially built "2000" rolling mill at the Cherepovets Metallurgical Plant and capacity at the Olenegorsk Mining and Concentrating Combine and the Lisichansk Oil Refinery. USSR Minpromstroy

[Ministry of Industrial Construction] organizations turned over for operation a livestock complex at the Luzino Sovkhoz in Omskaya Oblast and facilities for the L'vov Ceramics Plant. Production has been obtained at the Khor Hydrolysis Plant in Khabarovskiy Kray, which was erected by Minvostokstroy [Ministry of Construction in the Far East and Transbaykal Regions].

The last power unit, of 300,000 kilowatts capacity, was put into operation ahead of time at the Syrdar'inskaya GRES. With its introduction, the power station reached its designed capacity of 3 million kilowatts. The first hydroelectric power unit at the Kupsayskaya GES in the Kirghiz SSR also was turned over ahead of the scheduled deadline. Power units were also turned over during the first half of the year at the Leningrad Nuclear Electric-Power Station (1 million kilowatts), the Kol'skaya AES (440,000 kilowatts) and Ekibastuzskaya GRES-1 (500,000 kilowatts).

The erection of facilities for the second phase of the Kama Association for the Production of Heavy Trucks was completed. The KamAZ [Kama Motor-Vehicle Plant] went to its designed capacity of 150,000 diesel trucks per year.

Portions of the Surgut-Polotsk Oil Pipeline and of the Punga-Ukhta-Gryazovets Gas Pipeline that were more than 500 and 250 kilometers, respectively, in length were accepted for operation.

USSR Minstroy [Ministry of Construction] subunits introduced 72 of the most important national-economic facilities into operation. Among them were capacity for the output of the catalytic reforming of raw materials at the Kirishinefteorgsintez Production Association, 420,000 tons of pig iron at the Rustav Metallurgical Plant, 50,000 tons of caustic soda and 50,000 tons of liquid chlorine at the Yavansu Electrochemical Plant and 300,000 tons of ethylene at the Gor'kovnefteorgsintez Production Association, and a poultry factory for 200,000 layers.

The collectives of 16 regional organizations coped successfully with goals for the first half of the year. These include Glavprivolzhskstroy [Main Administration for Construction in the Volga Economic Region], the Voronezh, Kalinin, Mariy, Pskov, Chuvash, Penza, Tambov and Mordvinia Regional Construction Administrations, the Kaliningradstroy and Soyuzspetsstroy Production Associations and the construction ministries of the Uzbek, Georgian, Lithuanian, Kirghiz and Tajik Union Republics.

Hundreds of workers' brigades are demonstrating models of highly productive labor. Among them are the bricklayers' brigade of D. Zazulin of Uzbekshakhtostroy Trust, the Voronezh brigade of erectors under P. Uze, and the plasterers' brigade from Kaunasstroy Trust under K. Nashlenis.

A rise in the technical level of construction, the introduction of scientific and technical achievements, and the mechanization of work also helped in success of the business. During the first half of the year alone the share of fully prefabricated construction increased over the corresponding period of last year by 2.4 percent, reaching 74 percent for the ministry as a whole. The use of slab fully fabricated at the factory, of industrially produced divider walls, progressive types of piles, standardized leak-proof thermal barriers for building roofs, and so on increased.

Organizational forms, such as the brigade contract, competition under the "workers' relay race" principle, and Orel's continuous planning method, which have been proved in practice, continue to be developed at our construction projects. In the first half of the year, for example, 47 percent of the work volume was carried out by the brigade-contract method, and three-fourths of the brigades of the

housing-construction combines worked under the start-to-finish contract method. And at such DSK's [housing construction combines] as those of Tallinn, Chuvashia, Fergana, Voronezh and Vladimir, a complete transfer to this method was made.

The construction, reconstruction and expansion of existing industrial enterprises has continued. Capacity increased for recovering oil and gas and for producing pig iron, steel, finished rolled ferrous-metal products, sulfuric acid, caustic soda, metal-cutting machine tools, trucks, and a number of types of products of the wood-working industry, light industry, the food industry and the construction-materials industry.

State investment in the national economy was about 53 billion rubles, rising 4 percent over the first half of 1980. Total contracting work carried out by state construction and installing organizations increased by 2 percent, while the figure for interfarm organizations was 4 percent.

Work on the erection of the Baykal-Amur Mainline, Atomash, the Cheboksary Industrial-Tractors Plant and many other most important facilities for the national economy was performed at a rapid pace.

Through state capital investment and the funds of housing-construction cooperatives, 540,000 new, well-appointed apartments totaling 27.6 million square meters in area were put into use. Moreover, a large number of apartments and individual houses were built by kolkhozes and the populace through their own resources and with the help of state credit.

General-education schools for 100,000 students, preschool institutions for 85,000 children, hospitals to accommodate 10,000 beds, dispensaries and polyclinic institutions for almost 20,000 outpatients per shift, and many other facilities for social and cultural purposes were turned over to clients.

However, the plan for the first of the year for building housing and social and cultural facilities failed. Neither was the plan for introducing a number of the most important items of production capacity into operation carried out. Many construction organizations did not cope with tasks for construction-commodity output volume and labor productivity growth. This happened because a general change for the better still had not taken over at our construction projects. In many cases allocated funds, supplies and equipment and personnel resources were, as before, dispersed; they were not being properly concentrated at facilities due for early startup and at the most important construction projects. As in preceding years, at construction sites there were still much manual labor and a lack of organization, violations of construction-work technology were committed, and idle time was great. Nor was construction quality, especially of housing, at the proper level.

One conclusion can be drawn: construction organization supervisors, engineers and technicians still have not taken adequate measures to insure strict observance of state, planning, and labor discipline, and the importance of the goal of unconditional fulfillment of tasks for 1981 and for the five-year plan as a whole in the capital construction field have not sunk in to the fullest.

The builders are required to erect industrial enterprises, housing and facilities for social and cultural purposes not only by the established deadlines and with good quality but also with the highest degree of economy. Each facility that is

being newly built should have economical designs and layout solutions and should be erected out of economical materials and structure. And the builders themselves are obligated to save materials and power resources in every possible way, to do business in an economical manner at construction sites, to get rid completely of worktime losses and to raise greatly the states of organization and of discipline. To work in this way at construction sites--this is the obligation of each builder, as dictated by our party's decisions.

11409

CS0: 1821/129

CONSTRUCTION

USSR MINISTER OF INDUSTRIAL CONSTRUCTION REVIEWS RESULTS FOR 1981'S FIRST HALF

Moscow SOVETSKAYA ROSSIYA in Russian 9 Aug 81 p 1

[Article by A. Tokarev, USSR minister of industrial construction: "The First Precept"]

[Text] Capital construction is one of the leading branches of the national economy. In order to present a notion of the scale of building, I will name these figures: about a fourth of state-budget funds and about 15 percent of the country's industrial output are spent to increase the social and economic potential. It is very important that the enormous financial and material expenditures be transformed more quickly into operating industrial complexes and well-appointed housing rayons.

During the last five-year plan USSR Minpromstroy [Ministry of Industrial Construction] collectives did 15.7 billion rubles' worth of work within the Russian Federation. More than 700 industrial facilities were turned over for operation. Among them were such ones as a "150" rolling mill at the Beloretsk Metallurgical Combine imeni M. I. Kalinin, complexes for the production of ammonia and carbamide at Novomoskovsk's Azot Association and capacity at the Kondopoga and Segezha Pulp-and-Paper Combines and at the Kazan' Orgsintez Association. Construction projects of the Nonchernozem Zone occupy a special place in our program. Annual work volume here has doubled in the past 5 years.

Our contracting organizations have made a remarkable contribution to the execution of the social program. If all the well-appointed housing that we have built in Russia were brought together in one place, it would be a city with a population of 3 million.

Much has been done. But still more difficult goals lie ahead. "The new five-year plan will be a serious test of the builders," Comrade L. I. Brezhnev has noted. "Its characteristic feature is the concentration of efforts in every possible way on the most rapid completion and startup of those enterprises that are capable of providing for the greatest growth in output and for clearing out bottlenecks."

USSR Minpromstroy is to build 638 facilities for the economy in the Russian Federation. The principle ones are large facilities for oil-refining capacity at Grozny, Kuybyshev and Ufa. Ministry organizations are taking an active part in expanding the bases for the output of consumer goods.

A more precise course directed toward final results and an intensification of the construction processes require profound restructuring of planning, evaluation and

incentives for contracting agency activity. What is being initiated in this connection? The final construction-commodity output is becoming the main criterion. Plans that are stable for the five-year period, with a breakdown by year, that are now being worked out for the branch ministries will be an important lever for raising construction effectiveness. New unified master schemes for management of the construction ministries are in the approval stage. What do they call for? First, a reduction in the number of administrative tiers to two or three. Second, a strengthening and specialization of construction subunits. The course being taken here is to create construction and installing operations associations. For example, 22 associations are to be established in large cities and rayons that have large amounts of work.

Progressive construction methods will be adopted more decisively. For example, USSR Minpromstroy is erecting several hundred of the more important national economic facilities by the flow-line group method in accordance with progressive industrialized variants. The result has been convincing: prior to the development of the flow-line system, the level of prefabrication of petrochemical and oil-refining facilities was 20 percent, but now it exceeds 60 percent. The component method, large-module erection and the erection of outfitted-module installations with full technological "filling" with utilities and industrial equipment are being used increasingly widely at industrial construction sites. For example, F. Shtaenbakh's brigade installed a hydrocracking facility at the Omsk Oil Refinery with a finished industrial component of 700 tons. A complex for producing methanol is being erected by the component method at Gubakha (Permskaya Oblast). The complex is distinguished by a high degree of industrialization of construction.

In housing construction we are paying special attention to dissemination of the "Orel continuous-planning method," to the organization of a flow-line conveyor in accordance with an "enterprise to transport to construction project" scheme, and to the erection of large-panel apartment houses. The Krasnodar variant of large-module housing construction, by which buildings are three-quarters prepared under factory conditions, promises great advantage. Our powerful support is the brigade-contract method. It is necessary to work actively here to create conditions for developing and introducing it comprehensively.

USSR Minpromstroy as a whole is coping with the introduction of housing and with the plan for erecting facilities for livestock and feed production and factories for meat-type poultry. Eighteen large production facilities have been turned over for operation ahead of time. At the same time we again find ourselves in arrears to workers of the Nonchernozem Zone. The state of affairs does not satisfy us at facilities that produce consumer goods and mineral fertilizer. Eighteen items of production capacity that were carried over from last year's programs have not been completed. The startup of complexes for the production of potassium nitrate at Berezniki and of methanol at Novomoskovsk's Azot Association have been set aside. Because documentation, material resources and equipment were not provided us and our clients, the plan procedure for providing for regularity of the startup program failed. About two-thirds of it falls in the fourth quarter. The ministry intends to examine in depth the readiness of facilities due for startup and to take additional measures to speed up the work.

Our task is to achieve a precise rhythm and a good state of organization in all elements of the construction assembly line. Everything that has been planned should be introduced on time! This is the first precept of our work.

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CSO: 1821/129

CONSTRUCTION

BELORUSSIAN SSR: PROBLEMS IN DEVELOPMENT OF INDUSTRIAL NETWORKS

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 7, Jul 81 (signed to press 17 Jun 81)
pp 69-70

[Article by E. Patrovskiy, engineer of BelNIIPgradostroitel'stva [Belorussian Scientific-Research and Design Institute for Urban Development]: "Land, Development and Cost"]

[Text] About certain problems in forming the republic's industrial parks.

The design and construction of industrial parks—enterprises with common utilities and services networks and structures—have been going on for a long time. They are resolving architectural-layout and urban-development problems in new ways, the organic tie of industrial and residential land is better provided for, and the basis is laid for the rational development of industrial rayons in the future.

Right now 52 schemes for master plans for industrial parks, as well as schemes for siting and putting order into the development of zones for industrial bases and auxiliary facilities, have been developed. The total area of industrial parks now exceeds 15,500 hectares and comprises 85 percent of the urban industrial land. The density of their development varies within a fairly broad range—from 20 to 70 percent. Thus, 9.4 percent of the industrial parks have a density of less than 25 percent (Mogilev, Kolodishchi and Fanipol'), comprising 6.2 percent of all the industrial-park land; 43.8 percent are characterized by a buildup density of 25-45 percent, occupying 39.7 percent of the land; and about half have a density of more than 45 percent and make up 54.1 percent of the land.

Thus, an analysis of the technical and economic indicators of master plans for industrial parks and their implementation testifies to the existence of substantial land reserves. A major portion of the land often remains unused because of the irrational placement of some enterprises, the unfortunate layout of their master plans, the complexity of configuration of the grounds of various enterprises, and poorly thought-out solutions for schemes for transport and for utility and services facilities. Thus, the average buildup density for the industrial parks being analyzed is 40 percent, and the coefficient of their land use is 60 percent.

The land utilization indicator of an industrial park is not as decisive a factor as the buildup density indicator of the enterprises, where control values have been introduced. However, the land utilization factor plays the role of the criterion

in the general evaluation of layout-solution quality. In the master plans of the industrial parks being analyzed, it varies from 45 (northern Mogilev) to 87 percent (Novopolotsk).

Such variations in the land utilization factor are explained by the different methods for computing it. A republic-wide increase in this indicator of slight magnitude for each individual design would lead to a considerable saving of land. In design practice proper attention is not being paid to the land utilization factor, so when justifying land requirements for construction, the sizes of the sections are, as a rule, overstated. The main reason is the lack of scientifically substantiated standards for specific land intensiveness for the enterprises being designed.

As a result, specific land intensiveness of industrial park master plans averaged 2.54 hectares per million rubles—with a variability from 0.35 hectare per million rubles (in southern Borisovo) to 7.6 hectares per million rubles in Minsk (Kolyadichi). In this case 63.3 percent of the industrial parks are being developed with slight or moderate specific land intensiveness, but a substantial portion of them are being developed with high and very high (more than 2.54 hectares per million rubles) specific land intensiveness. At the large industrial parks with high buildup density, it is less than 1 hectare per million rubles, while in small parks with low buildup density it varies from 1.62 to 7.12 hectares per million rubles. In such cases both the land and the capital investment are being used irrationally.

Research indicates that primary attention to specific land intensiveness influences the buildup density and the budget-estimated cost of construction. Thus, if the budget-estimated cost is 20 million rubles or less and the buildup density is less than 30 percent, specific land intensiveness averages 5.53 hectares per million rubles, while if the cost is more than 20 million rubles and the density is more than 45 percent, it is 1.5 hectares per million rubles or less.

Consequently, questions of the determination and establishment of the buildup density and the land utilization coefficient are not being properly reflected in the practice of designing industrial parks. Moreover, while density norms for building up enterprises have been developed for the various industries, there are no such indicators for industrial parks. Therefore, the development of industrial parks under Belorussian conditions must be performed with a determination of the standard classification of the indicated factors.

When industrial clusters are being designed, not only the question of more rational use of land is posed. Such factors as interlocking and increase in the number of stories for enterprises and the provisioning of versatility and standardization of design proposals should also be considered. Unfortunately, these requirements often are ignored, hindering the siting of enterprises, especially in small cities. The poorly thought-out forming of industrial clusters in medium-size and, especially, in large cities leads in some cases to an excessive concentration of production and of workers on limited land. For example, the high concentration of people in the southern industrial park of Brest and the eastern and western parks of Mogilev, as well as in Vitebsk and Bobruysk parks, has exacerbated transport and many other problems.

Here are more examples. The overwhelming majority of industrial parks are being sited among residential rayons and do not have prospects for land development.

This leads to the withdrawal of arable land adjacent to the city. Thus it was planned that an industrial park of 250 hectares in Mar'ina Gorka be placed on agricultural land. It was the same also in Svetlogorsk. Industrial parks of Bobruysk, Pinsk, Zhlobin and Mogilev that were established on the basis of momentary advantage violated the layout structure of these cities and hampered their later development.

On the whole, experience in the development of master plans for industrial parks and in park construction indicates convincingly that the actual economic benefit from siting enterprises in industrial parks greatly exceeds the estimated benefit, especially when urban-development and sanitary and other requirements are considered.

In addition to reductions in construction costs and construction time, a number of social problems are solved: regulation of the normal development of cities, regularization of the utilities and services networks through cooperation in the use of the funds of industry and of local soviets of people's deputies, improvement of domestic services for the population, and convenient placement of enterprises and of construction industry bases. This siting also enables such a question as the cooperation of auxiliary and basic production facilities to be resolved. Therefore, cooperation in the design of schemes and master plans for industrial parks by leading Belorussian SSR Gosstroy institutes—BelNIIPgradostroitelstva and Belpromproyekt [Belorussian Institute for Industrial Design] must be strengthened. They should put the design of industrial parks on a solid basis which considers the peculiarities of the economic and natural systems of the republic.

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CONSTRUCTION

RURAL CONSTRUCTION PROSPECTS REPORTED

Krasnodarskiy Kray

Moscow STROITEL'NAYA GAZETA in Russian 5 Jul 81 p 3

[Article by V. Artyushkov, deputy chairman of the Krasnodarskiy Kray Ispolkom:
"Prospects up Until the Year 2000"]

[Text] The opinion exists that things comes easily for the Kubaners because, they say, they have the rich chernozem. However, the land-tillers' successes are explained not just by this but primarily by the deep social and economic transformations in the village and the conversion of agricultural production to an industrialized base. The policy of radical reconstruction of rural communities and the transformation of large and small Cossack-type villages into agricultural-industry settlements with a high level of the amenities has been adopted.

In accordance with the integrated program of rebuilding and renewing the village that has been developed in the kray in the past decade, more than 11 million square meters of housing, not a few schools, children's preschool institutions and hospitals, and many shopping and domestic-services facilities have been built.

At our order, Moscow's Giprogor [State Institute for Urban Design] worked out a technical and economic scheme for developing the kray prior to the year 2000. This document defined a strategic program for renewal of the Kuban' village. Designs for rayon layouts were worked out for all rayons on the basis of it. Slated for the initial reconstruction were 860 villages of the ordinary, Cossack and mountain types. The main volume of construction of housing and of facilities for cultural and domestic-amenity purposes was concentrated in them. Designs for the layout and the development of each of these communities were drawn up.

The basic principles of the reconstruction are compactness and density of the buildup, which will enable architectural expressiveness to be achieved, expenditures for utilities and services and civic amenities to be greatly reduced, and fertile land to be used more rationally. The creation in the villages of attention getting social centers by amalgamating various buildings into a single layout complex is called for. Today, architectural ensembles have now been completed in the villages of Oktyabr'skiy and Yubileynyy of krasnoarmeyskiy and Temryukskiy Rayons, in the Cossack-type villages of Leningradskaya, Platnirovskaya and Tengin-skaya, in the village of Pushkinskiy of Gul'kevichskiy Rayon, and in many others.

As is known, the conversion of any village is a time-consuming and complicated process. Executing a well-thought out conversion requires persistence and consistency, and the decisiveness to bring a design to a logical conclusion without yielding to short-term economic or other considerations. The central farmstead of the experimental seed-growing farm Berezanskoye of the Novoberezhanskiy settlement can serve as an example of a purposeful conversion.

Twenty years ago a decision to rebuild it was adopted, and a master plan was worked out and approved. During this time the settlement greatly changed in appearance—the streets were ornamented by new housing with well-appointed apartments and a central boilerhouse, water and sewer systems were constructed, and a gas grid was laid down. A secondary school with a stadium, a club, an administrative building, a kindergarten and nursery, a department store, and a cafe were erected. Mosaics, reliefs and costly wood embellished the premises, and artistic paintings were used. The many years of work by architects, designers, builders and the farm's collective received worthy recognition—the Novoberezhanskiy settlement was awarded a Certificate of Honor by the VDNKh USSR [Exhibition of Achievements of the USSR's National Economy] for results in the last stage of the All-Union inspection-contest for the best layout, buildup and amenities.

I will note that during the 20 years more than once there was someone who wanted to revise the master plan, "because of economic necessity," of course. And it is good that the architects and local party and soviet organs did not resort to compromises but realized the ideas that were laid down in the master plan. Proper credit must be given here to the kray's Architectural Section, whose workers kept the buildup under monitoring, and did not permit divergence from the approved master plans without special necessity. The section relies increasingly in its work on the architectural and engineering councils that had been created under the village soviet ispolkoms. These were extremely representative and authoritative organs. They included party, soviet and economic workers and representatives of the village intelligentsia. The architectural and engineering councils discussed new designs, followed the progress of construction of facilities and the quality of the construction, and made recommendations for improving the buildup and the amenities. Not one large building was erected without their knowledge and approval.

The experience gained in building up such settlements as Novoberezhanskiy is being used widely at other farms and rayons of the kray. This experience teaches, in particular, that rebuilding the village must start with the buildup of utilities and services facilities—the erection of ramified waterlines, sewer lines and a gas grid and the construction of purification structures. Right now this work is being done in all the kray's rayons.

The 26th CPSU Congress emphasized anew the necessity for making the material and cultural conditions and the amenities of city and village workers more nearly equal. The party's rayon committee and the rayon's ispolkom adopted a joint decision that defined the tasks for rebuilding the villages in the next few years. Basically, one- and two-story housing of the farmstead type, of one or two apartments each, are to be built, as well as interlocking multiple-unit apartment-house buildings, with ground plots assigned to each family. The kray's ispolkom approved also a catalog of designs for individual construction which included the best from existing standard designs for housing.

Execution of the integrated program to rebuild the kray's villages became possible thanks alone to the creation of a strong production base for rural construction

organizations. Their growth is evident especially distinctly in the example of the Kraykolkhozstroyob'yedineniye [Kray Kolkhoz Construction Association]. In 20 years this organization has built about 14,000 different industrial and public buildings. During the 11th Five-Year Plan this association is to do 1 million rubles' worth of construction and installing work, a third more than during the Tenth. Investment in its in-house base will come to 150 million rubles.

Glavkuban'risstroy [Main Administration of Kubanskaya Oblast for the Construction of Rice Fields] is making a major contribution to the transformation of the countryside. Along with irrigation and land-reclamation operations, the collective is building much housing and many cultural and domestic-amenity facilities. On the Azov floodlands, or, as we call them, the new rice lands, the land reclaimers have built some farms with well-appointed settlements. These are the Ordynskiy, Kurchanskiy, Novopokrovskiy, Sladkovskiy, and Svetlyy Put' Sovkhozes and other sovkhozes for growing rice. During the last five-year plan, Glavkuban'risstroy introduced about 400,000 square meters of housing, many schools and kindergartens, and many facilities for cultural and domestic-amenity purposes.

In brief, the kray's rural construction workers have had many successes, but this by no means signifies that we have solved all the problems. For example, further development of Krasnodarsel'sstroy [Krasnodarskiy Kray Rural Construction Trust] is being held back because of weakness of the production base. Certain types of pre-fabricated reinforced concrete, especially for livestock premises, have to be imported from other areas, leading to more expensive construction and degradation of economic indicators. Obviously, RSFSR Minsel'sstroy [Ministry of Rural Construction] must become concerned about speeding up development of the administration's production base.

There are deficiencies in design and layout. Thus, during the erection of livestock raising complexes and other large agricultural facilities, client ministries cut the funds for housing and for cultural and domestic-amenity facilities, striving in this way to reduce the budget-estimated cost. This in no way leads to anything good, as experience indicates: the lack of housing entails a shortage of workers, which, as a result, affects production effectiveness negatively.

Obviously, the time has come when a strict procedure must be established which prohibits the cutting of budget estimates through housing and facilities for cultural, social and domestic-amenity purposes. Integrated construction will permit not just a rise in the level of the buildup and of amenities for the village but also more rapid assimilation and more intensive use of the production capacity that is being introduced in the name of more rapid realization of the production program.

Model Rural Housing

Moscow STROITEL'NAYA GAZETA in Russian 10 Jul 81 p 3

[Article by M. Atabayev, deputy chief of the Administration for the Layout and Development of Rural Communities, and B. Sokolov, manager of the Architectural Administration of Gosgrazhdanstroy [State Committee for Public-Building Construction and Architecture] and V. Turkin, USSR Minsel'sstroy [Ministry of Rural Construction] Press Center correspondent: "Designs for Tomorrow"]

[Text] When you walk along Kievskoye Shosse, a sign is seen in front of the gate to Sof'ino village: "The 'Druzhba' Housing Construction Cooperative." The modern

village of Nara Sovkhoz emerges from the wall of a forest. This is the prototype of the future village, which many talk about today. Good-quality brick houses with improved layout and finishing work, built according to individual order. No two of them are alike. The houses have all the city conveniences plus a plot about 600 ares in area in front of the apartment, a cellar, a barn for cattle and poultry, and underground garages. For recreation there is a cafe and bar and a family club, the "Yelochka," with fireplaces, lecture halls, and a collection of games.

The buildup of the village that began 3 years ago continues. Altogether, more than 40 apartment houses, basically one-story, a social center, private-plot out-buildings, and garages for personal cars will be erected.

Sof'ino is one of the examples of a modern integrated rural development that were presented at a topical exposition that was developed in the Construction Section of VDNKh SSSR [Exhibition of Achievements of the USSR's National Economy]. Its subject: "Standard Designs for Apartment Houses and the Integrated Development of the Village." The exposition reflects achievements in the integrated transformation of villages, their conversion into well-appointed communities, and it also shows the path to developing rural housing and civic construction during the current five-year plan.

In looking at the exposition's exhibits you will be convinced that in the best villages of the country production facilities are being constructed in phase with apartment houses and institutions for cultural and domestic services, and that work is being done successfully on civic improvements and landscaping and on the creation of conditions for the conduct of personal subsidiary economic activity. For many modern villages, a rise in the level of industrialization—the introduction of lightweight structure made of wood and lightweight concrete panels, wood-concrete modules, and so on—is characteristic. I would like to note that today most apartment houses and social buildings are being erected in accordance with standard designs that have been developed under new norms.

Let us note that there are at present more than 800 standard designs for rural housing buildings made of various types of structure. More than 200 standard designs for one- and two-story and one- and two-unit farmstead apartment houses are at the service of individual builders. The functional layout of the premises and the presence of subsidiary premises are called for in the apartments, and the size of the kitchen has been increased.

The existence of diverse designs helps in the selection of housing in accordance with the population's demographic makeup and the weather, climatic and nationality characteristics of each part of the country.

"The Main Directions for Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990" set the task: build well-appointed apartment houses in the village, with private plot buildings, children's preschool institutions, clubs and other facilities for cultural and domestic-amenity purposes, at an outstripping rate. Capital investment for these purposes is being greatly increased.

Change in the structure of capital investment compels that another, more critical look be taken also at the exhibit being shown at the VDNKh SSSR. What conclusions suggest themselves? First of all, it is evident that, of the whole mix of housing

that is included in the series, construction enterprises still are making only one or two types of houses, which does not enable a high-quality development to be effected. The introduction of new series is lagging at rural housing-construction combines, especially in housing of the farmstead type.

In order to carry out successfully the tasks set for the next 5 years, the output of factory-produced wooden housing must be accelerated. The exposition presented the designs of one- and two-story apartment houses of the 115, 139 and 209 series, which are most widely distributed today, and of social buildings with walls made of wooden, wood-concrete, squared-timber and other structure. Interesting solutions that involve the use of wood are a series of rural apartment houses, private plot buildings and social buildings with walls made of wood-and-concrete box modules and of wooden box modules.

Box-module housing construction, whose products are convenient for transporting on rural roads and for erection, will be further developed. It is also proposed to use widely the base of city housing-construction enterprises that are making large-panel buildings. As before, houses made of brick and other local building materials will be constructed in the village.

The exposition that was opened at the VDNKh SSSR will help to spread the wide application of modern designs and of integrated reconstruction of the village.

Belorussian Rural Housing

Moscow STROITEL'NAYA GAZETA in Russian 17 Jul 81 p 3

[Article by V. Yemel'yanov and V. Sokolovskiy, architects of BelNIIGiprosel'stroy [Belorussian SSR Scientific-Research and Design Institute for Design for Rural Construction: "No Villages Are Forgotten"]

[Text] There are today in Belorussia no few rural settlements that meet modern requirements for development. In these settlements an urban level of comfort is combined with definite virtues of the rural environment. They are distinguished by a stable composition of the population, including youth. Many of them have been singled out in distinctive fashion by VDNKh SSSR [Exhibition of Achievements of the USSR's National Economy] and can serve as prototypes of future Belorussian settlements.

The principles for developing the republic's rural regions and for shaping the build-ups have been determined as a result of practical verification by the experimental-demonstration construction of seven farms that were begun in 1969. These principles are now being used in large-scale design and construction. What are the results? First of all, the experience of advanced kolkhozes and sovkhozes has confirmed the necessity of an integrated approach to the problem and an interrelated solution of the production-economics, engineering and social tasks, taking into account the republic's regional characteristics. These are an intensification of agricultural production, improvements in settling people, the creation of a network of service institutions for the rural population, and a rise in the qualitative level of the architectural and layout organization for the buildup and of the three-dimensional layout solutions for housing and social buildings.

Let us note that the integrated rebuilding of the Belorussian village, with its historically prevailing small-scale rural settlements, is of paramount importance. For it is well known: the dispersed state of the population about numerous villages prevents a strengthening of production and the introduction of advanced progressive technology and hampers the execution and reduces the effectiveness of social and cultural measures.

Because of this, the policy has been adopted (and practice confirms its correctness) of developing a single community for a farm. The concentration of production, housing and public-building construction in the central settlements of kolkhozes and sovkhozes meets the requirements for developing agricultural production and enables services for the rural population to be improved.

It should be noted, however, that, despite the changes achieved in this field, the pace of resettling residents in promising settlements has proved to be much lower than proposed. Most existing settlements have been preserved. An increase in the population in the central settlements of some kolkhozes and sovkhozes is explained primarily by the arrival of new specialists and by natural increase, not by the resettling of small communities.

What are the causes of the slow transformation of the prevailing pattern of settling? Aside from purely economic factors connected with inadequate allocation of capital investment for creating new settlements, it is the disinclination of a definite portion of the rural population, basically older adults, to change the place of residence and accustomed life style, as well as the extremely small proportion in the population makeup of most of the unpromising settlements of the skilled specialists that are needed at the central farmstead.

It is becoming evident that at present and in the foreseeable future a substantial portion of the existing communities in the republic will be retained. Therefore, one of the important tasks in the modern era of rural reconstruction is to create normal living conditions in the settlements that are being preserved for their estimated lifetime, primarily by improving cultural and domestic-amenity services.

As experience in the development of experimental-demonstration farms indicates, the cultural and domestic-amenity services of central settlements covers to a small extent the people of the remote villages. Moreover, the comparatively small number of residents of the farms does not enable the necessary variety of services to be arranged. As a result, the peasant is compelled to turn to city institutions and services enterprises for help.

Where is the way out? A multiple-stage scheme of services: in addition to the central settlements of farms, distinctive centers for episodic and periodic services for people of some farms are to be created in the large villages. In addition to this, we are planning to place servicing facilities in existing and appropriately equipped buildings, and also in new lightweight collapsible buildings, in those communities that are to be preserved for their estimated service life. The introduction of mobile forms of serving the public will be continued.

In order to improve housing and domestic-amenity conditions in existing communities, the housing buildings and the street-and-road network are to be maintained in a suitable state, and work will be done to arrange for local systems of utilities and services support and for civic amenities and the landscaping of grounds.

It is known that various three-dimensional-layout solutions for housing were verified during experimental-demonstration construction. What is to be said about the results? Large and medium-size families that ordinarily reside in three- or five-room apartments and farmstead houses want, as a rule, to have an expanded private farm plot and, at the land sections, buildings for cattle, hogs and poultry.

In our republic, one- and two-unit apartment houses are being erected, as a rule, through the people's resources. About 50 different designs have been developed for individual construction. Most of the designs call for an enlarged set of auxiliary premises, and also buildings for farming.

Small families and, often, medium-sized ones live mainly in sectional two-story apartment houses. Barns for cattle and implements are sited on specially allocated grounds. We have also developed a collective organization of personal private plots which enables the level of comfort of the housing environment to be raised, labor to be eased, and an animal-feed base and the production and sales of output to be realized, and it also enables the involvement in personal-plot farming of that portion of the village population that might not have the opportunity to do so because of heavy involvement in social production.

Based upon an analysis of experience in the reconstruction of our villages, it has been found that two-story apartment houses—interlocked, with apartments on two levels, and with apartments placed by stories and separate entrances, as well as sectional-type apartment houses—meet modern requirements more completely. Single-section four- and five-story apartment houses, although they enrich the appearance and intensify the architectural expressiveness of the development and also reduce the length of utility and service lines and the area of communities, scarcely find wide application under modern conditions, because such a development makes the working of personal plots more difficult.

The experience in social and economic restructuring of the village that the republic has gained will be developed during the 11th Five-Year Plan. Already today the framework of the experiment has been greatly enlarged. In accordance with its program, which was worked out under the supervision of BSSR Gosstroy and BelNIIGiprosel'stroy, 14 settlements which, in the long term, should incorporate the population of the 149 communities that exist here, are being developed in integrated fashion at 11 of the republic's farms.

The successful implementation of the program for experimental construction and the introduction of its results into practice will enable large-scale reconstruction of the Belorussian Village to be raised to a qualitatively new level and realistic prerequisites for eliminating the existing differences between city and village to be provided for in a relatively short time.

Nonchernozem Zone Housing

Moscow STROITEL'NAYA GAZETA in Russian 31 Jul 81 p 2

[Article by G. Vedeov, RSFSR first deputy minister of rural construction: "The Program for the Center of Russia"]

[Text] Continue the integrated program for transforming the RSFSR's Nonchernozem Zone into a region of highly productive cropping and animal husbandry and for developing the branches of industry associated therewith.

Provide for the further development of agriculture and the industries associated with it in the Central Chernozem Zone.

(From "The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990.")

It is difficult in evaluating, in the aggregate, the scale of transformation in the agriculture of the RSFSR's Nonchernozem Zone to find anything similar to it in the history of our country, except, perhaps, the virgin-lands epic. The analogy can be cited not only in scale of the operations but also in their exceptional importance to the implementation of the foodstuffs program.

During the last five-year plan, subdivisions of our ministry created in the Nonchernozem Zone a high-capacity production potential, the effective use of which makes completely realistic the successful fulfillment of the strenuous construction program that was developed on the basis of party Central Committee and government decrees.

There is no exaggeration in the definition "strenuous." Suffice it to say that the task for executing contracting work during the erection of housing and facilities for cultural and domestic-amenity purposes, for agricultural enterprises and organizations of republic subordination and for Glavnechernozemvodstroy [Main Administration for the Construction of Water-Resources Management Facilities in the Nonchernozem Zone] exceeds 1.7-fold the level achieved during the 10th Five-Year Plan. This year it is planned to introduce livestock buildings for 128,600 cattle stalls, poultry-raising farms for 542,600 head of poultry, grain elevators for 392,200 tons of grain, mixed-feed plants with a total capacity of 2,130 tons per day, and a number of other production facilities, as well as housing totaling 1,365,000 square meters in total area.

The implementation of this program is occurring in an environment of an increasingly severe demographic situation. The flow of personnel into the sector is being constantly reduced, and this means that the laboring collectives will carry out growing amounts of work with practically the same number of personnel. It means that the drive for accelerated labor productivity growth is acquiring exceptional importance.

In order to reach the targets defined by the 26th CPSU Congress and recent decrees of the CPSU Central Committee and the USSR Council of Ministers decrees, our ministry is now executing a number of measures aimed at a sharp rise in labor productivity.

Further industrialization of construction, which entails a high degree of factory preparation of structure and parts, an increase in the amounts of fully prefabricated construction, the use of advanced technology, and the accelerated assimilation of lightweight materials, will occupy a prominent place in the directions along which this work will be conducted.

In particular, keramzit-concrete structure, which enables budget-estimated costs to be reduced by as much as 5 percent and labor expenditures to be cut 1.3-fold, is being used increasingly today in the construction of production buildings. The specific share of this progressive material in the total amount of prefabricated

reinforced concrete has been brought up to 25 percent. However, its potential still is far from having been exhausted. Right now, for example, we are refining the technology for the expanded use of keramzit foam concrete. Structure made from it (mainly enclosure structure) is 15 percent lighter than keramzit concrete, which makes its use profitable and convenient, especially in the countryside. Today the annual production of articles made from this material is 124,000 cubic meters, a third of all the keramzit-concrete structure. The introduction of the more modern technology developed by TsNIIEPSel'stroy [Central Scientific-Research Institute for the Experimental Design for Rural Construction] will enable us to double this amount in the next few years.

Nonchernozem Zone builders are successfully assimilating the technology of laying conduit-free pipelines. During the last five-year plan the amount thereof grew 4.3-fold and right now it has been brought up to 38 percent of the total amount of heating grid laid down. This will enable the cost per kilometer to be reduced by 15,000 rubles and up to 300 cubic meters of prefabricated reinforced concrete to be saved.

The use of compact purification structures (KOS's) promises substantial growth in labor productivity. Their manufacture has been arranged at the ministry's enterprises, and all administrations and trusts have been provided with design documentation and sets of metal molds. But nevertheless, the planned program for introducing KOS's was not met. The cause is a severe shortage of blowers. Right now, it is true, new types of designs have been developed which call for the use of high-pressure fans that are not in such short supply. However, neither are there enough of them to equip all the KOS's. If RSFSR Minsel'khoz [Ministry of Agriculture] and RSFSR Goskomsel'khoztekhnika [State Committee for Supplying Production Equipment to Agriculture] solve this problem in the near future we can install an overwhelming majority of the purification structures in a compact variant. In the Nonchernozem Zone, expenditures can be reduced by 2 million rubles this way and labor intensiveness can be reduced by 110,000 man-days annually.

Approximately a third of the growth in labor productivity during the 11th Five-Year Plan is to be obtained by the intensive mechanization of construction operations. Already today about 1,700 excavators, 1,800 bulldozers, more than 2,000 boom cranes and about 600 tower cranes, and much other equipment are being operated in the Nonchernozem Zone. The degree of the region's mechanization averages 29.2 percent.

The problem of the effective use of equipment must be solved during the new five-year plan. For at present, the workload on machines and mechanisms in many organizations that are operating in the Nonchernozem Zone does not exceed 10-12 hours per day. Organizational measures that are aimed at eliminating this deficiency which the ministry is implementing right now include: the concentration of equipment in specialized subunits and the creation of minor-mechanization sections and truck-mounted power-shovel and scraper-bulldozer brigades.

According to preliminary estimates the execution of a set of organizational and technical measures will enable us, prior to the end of the five-year plan, to cut expenditures for manual labor for earthmoving and painting work by 23 percent, for loading work 24 percent and for plastering by 30 percent of the 1980 level.

However, even in this area there are a number of problems that cannot be solved without the help of planning organs and other ministries, primarily Minstroydormash [Ministry of Construction, Road and Municipal Machine Building]. Rural builders are in severe need of high-powered bulldozers, mobile concrete plants, concrete mixers on truck chassis, and truck cranes with movable carriage and a boom with a lifting capacity of 5-8 tons. It is pertinent to state that the Soviet division of the Stroydormash-81 exhibition proves convincingly the enormous potential of our industry.

Nevertheless, the amount of equipment today cannot be considered as the decisive factor. An integrated state of the mechanization of construction operations means sets of equipment for minor mechanization and mechanized tools by type of work, general-purpose tools with a broad set of attachments, and, finally, a complex of construction equipment with sets of replaceable equipment. The large-scale production of such sets, in our opinion, is completely within the capabilities of Minstroydormash enterprises.

We recommend that a substantial growth in labor productivity be provided during the 11th Five-Year Plan by the use of new standard designs that call for a further increase in the prefabrication of structures. This year alone more than 50 structures are to be erected in accordance with such designs. A program for further improvement of standard designs for production buildings and auxiliary premises has been worked out.

The implementation of this program dictates the necessity for full use to the maximum of production-base capacity, which even today will enable all production and housing construction to be performed by industrialized methods. Meanwhile, not by far are all our subunits using this capacity effectively.

In this connection, it is especially appropriate to dwell on the work of rural construction combines, where a substantial portion of our capacity has been concentrated.

There are now 32 SSK's [rural construction combines] and SDSK's (rural housing construction combines) and by the end of the five-year plan there will be more than 70. Their establishment has helped the ministry's subunits to greatly increase the effectiveness and quality of the work. Suffice it to say that 20 combines that have existed since 1979 yielded during this brief period a 20-percent increase in the output of contract work. Output per SSK worker today exceeds the ministry average by 29 percent. The Kalinin combine doubled the amount of contracting work output in about 2 years. Output per worker here is 1.8-fold higher than the average throughout the regional construction administration.

However, in some of our subunits the assimilation of SSK and SDSK capacity has been drawn out unjustifiably. Thus, at the Oka, Bryansk and Vyaz'ma and certain other combines, only 25-45 percent of the capacity is being used. An organizational structure applicable to the flow-line system of construction is being shaped slowly here. The shortage of in-house housing turns out to be a shortage of workers. And the plan tasks for the workload of the combines have not been fortified by specific facilities and amounts of work.

Along with these factors which we are now eliminating, there are a number of objective factors. Among them is the basic place occupied by deficiencies in the

supplying of materials, for the components of labor-productivity growth named above can be realized only if the complete outfitting of construction projects with production-operations equipment has been correctly organized. Here is just one example. During the last 10 years the funds for timber allocated by the ministry have been reduced by 44 percent. If one also considers the chronic interruptions in deliveries, it is not difficult to imagine the situation in which our trusts and administrations find themselves each year.

Our organizations expect help also from planning and supply organs in the provisioning of transport equipment. The ministry's motor-vehicle fleet urgently requires radical renewal and augmentation, primarily in the Nonchernozem Zone and the Central Chernozem Zone.

A worrisome situation has been prevailing in the region also in the sphere of road construction. For this is an element of the system without which organizations find it impossible not only to solve effectively the problems that face them but also to conduct their normal vital activity. The ministry is ready to take upon itself definite amounts of road construction. It will be necessary only to supply our subunits with the special equipment and to solve other problems that are within the jurisdictions of USSR Minsel'stroy [Ministry of Rural Construction] and USSR Gosplan.

The fallacious practice of loading Minsel'stroy units with the construction of facilities that are not within their specialization hampers labor productivity growth of the Central Chernozem Zone, the share of these "outside" programs having a disturbing tendency to grow.

Certainly, much depends upon local organs. And so we are now trying to seek strong contacts with the oblast committees of the party and with soviets of people's deputies. Right now, joint decrees of our ministry's board and of oblast supervisory organs in several Central Chernozem Zone oblasts are being prepared. It is certain that they will play a major role in the creation of favorable conditions for successful fulfillment of the program for developing the Chernozem Center.

In steady adherence to the policy of industrialization of construction, improvement in the organization of operations, and steady growth in labor productivity based upon these factors, we see the main prerequisites for successful implementation of the decisions of the 26th CPSU Congress and of party and government documents that are dedicated to the development of Russia's central regions.

Eastern Regions' Housing

Moscow STROITEL'NAYA GAZETA in Russian 2 Aug 81 p 2

[Article by S. Sabaneyev, RSFSR Gosstroy chairman: "The Villages Will Become More Attractive"]

[Text] On 5 August a seminar-conference will begin work in Krasnoyarsk on the topic, "On Measures for Improving the Integrated Development of and Provisioning of Amenities for Rural Settlements of Siberia and the Far East." The RSFSR Council of Ministers is conducting it.

"Strengthen development of the construction base, the construction of housing, municipal, cultural and domestic-amenity facilities for agriculture and the production of machinery and equipment for the leading branches of the eastern regions, and on that basis increase the degree of integration in the development of these regions and provide them with personnel."
(From the "Main Directions.")

The accelerated development of the industrial and power-engineering complex in the eastern regions and the development of transport in the vast areas that have inexhaustible mineral raw-material resources are causing personnel to move east and the republic's settlement patterns to change. Manpower can be retained and high labor productivity achieved, as is well known, only by creating appropriate cultural and domestic-amenity conditions and by organizing the continuous supply to the population of consumer goods, primarily food products. This is why the problem of creating a foodstuffs complex in the eastern regions is of decisive importance.

The development of agriculture in these regions is linked with a concentration of it and the creation of intensive-agriculture zones that specialize in the production of produce, the delivery of which from other regions is difficult, close to large cities, industrial centers, and regions of BAM [Baykal-Amur Mainline] construction.

An indispensable prerequisite to realization of the planned program for a further uplifting of agriculture is the fulfillment of plans for capital construction in the village, primarily the construction of well-appointed housing and the whole complex of social and cultural facilities.

Many settlements of Siberian sovkhozes and kolkhozes can be named--for example, Belorechensk, Kamenka and Novo-Gromovo of Irkutskaya Oblast, Ust'-Bren of the Buryatskaya ASSR, Chaa-Khol' of the Tuviniskaya ASSR, Malinovka and Karaspel' of Krasnoyarskiy Kray--that are being developed in integrated fashion and at a good pace.

However, in the matter of the integrated reconstruction of Siberian and Far Eastern villages, very little has been done yet. Despite the fact that the amounts of construction of nonproduction facilities under the last five-year plan were extremely restricted and inadequate in a number of oblasts and autonomous republics, even they turned out not to have been accomplished.

During the 11th Five-Year Plan the amount of housing construction in Siberian and Far Eastern kolkhozes is to increase by almost 40 percent. The amounts of erection of children's preschool institutions will double, and the program for erecting facilities for cultural and domestic-amenity purposes will be greatly increased.

In order to implement planned programs successfully, the causes of today's failures should be analyzed and ways to eliminate the deficiencies should be planned. It is known, for example, that in the eastern regions, as in many other regions, the practice of financing a large number of rural construction projects simultaneously and the dispersion of housing construction over numerous settlements still predominate. During the last five-year plan, the estimated volume per sovkhov settlement being built up each year did not, in most oblasts, krays and autonomous republics of Siberia and the Far East, exceed 100,000 rubles, and for kolkhozes this figure was even less than 60,000-80,000 rubles.

Much is to be done also to improve the settling of people. This problem is felt more severely in the eastern regions, where the establishment of large industrial and power-engineering complexes continues, construction of the BAM is being conducted, new lands are being developed, and ore mines and industrial enterprises are rising up. Because of this, there will be a great increase in the role of regional and branch-of-the-economy planning and, especially, of regional layouts, which will enable plans for the siting and developing branches of the national economy to be coordinated and balanced and promising methods for rational settling of people to be identified.

Seventeen autonomous republics, krays and oblasts of Siberia and the Far East have now been provided with integrated schemes for regional layouts. The scheme for the Tuvinskaya ASSR will be completed this year. A scheme for the regional layout of the BAM zone has been developed. Giprogor [State Institute for Urban Design], with the participation of more than 50 subcontracting organizations, is designing a scheme for preserving the environment of this unique region. Half of the 14 designs for regional layouts of industrial regions of the BAM zone, which called for priority development, have been developed. For the others, work is being conducted at an accelerated pace and should be completed in 1983. But still it must be stated that, on the whole, the provisioning of this region with integrated schemes for regional layouts is supplied by about 15 percent. Gosgrazhdanstroy [State Committee for Public Building Construction and Architecture] should increase budgetary appropriations for these purposes.

Simultaneously, questions about raising the quality of regional layout and the responsibility of local planning and economic organs for issuing authentic baseline data and also about monitoring the implementation of proposals for the designs for regional layouts should be resolved.

Positive experience in this field has been gained in Kemerovskaya Oblast and Primorskiy and Khabarovskiy Krays, where urban development papers are used widely to plan, design and organize capital construction. This task has been posed well in Krasnoyarskiy Kray. At all stages--from issuance of data to its use in practical activity--the thoughtful and purposeful work of kray ispolkom sections can be seen.

The problem of the quality of the layout work is of special fundamental importance for rural settlements of the eastern regions. The diversity of the natural and climatic conditions and other factors--steppe and taiga, tundra and mountain systems, the great Siberian rivers, Baykal and the ocean's shore, the 8 climatic subregions, calculated temperatures down to -55, seismicity of up to 9 points, permafrost, and subsident soils--this is a far from complete list of the peculiarities that should be considered comprehensively in designing villages.

The architectural and layout solutions for the integrated development of Yanchikovo village, Toguchinskiy Rayon, of Novosibirskaya Oblast were successfully selected and implemented. The settlement was located on a bluff of the Ini River, in a pine forest, and the situation was correctly considered. The approach viewed from the rayon settlement was completed by the expressive and large-scale ensemble of the social center. Here there is the necessary set of buildings for cultural and domestic-amenity services, and the farmstead development is dominating.

The results of the last stage of the All-Union inspection-contest testify to the growing overall qualitative level of the design and layout work as a whole:

settlements of Siberia and the Far East were awarded VDNKh SSSR [Exhibition of Achievements of the USSR's National Economy] certificates.

However, the positive results do not mean that all the deficiencies have been eliminated. Thus, in particular, not by far are all villages of the Yakutskaya and Tuvin'skaya Autonomous Republics and of Amurskaya, Chitinskaya and Irkutskaya Oblasts provided with designs for layout and development.

Republic and central institutes recently developed many standard designs for housing, including farmstead housing, which answer better the interests of the rural residents, as well as designs for social buildings. For rural construction in regions of Siberia and the Far East, for example, 150 standard designs for housing and social buildings are included in the list of active designs. Moreover, more than 40 new standard designs have been worked out for housing and cultural and domestic-amenity buildings for construction in the settlements that are being developed on the BAM route. However, the use of many designs is hindered because of inadequate capacity of the production bases of the contracting organizations. Therefore, during the buildup of rural settlements of the eastern regions today, housing made of local building materials--squared timber, brick and others--predominate, and the level of industrialization of the construction of housing and public buildings remains low.

In the near future TsITP [Central Institute for Standard Design] of USSR Gosstroy, with the coordination of RSFSR Gosstroy, will issue a list of standard and individual designs for housing and social buildings that are recommended for construction in rural localities of the RSFSR's eastern regions.

Further accelerated development of the economy of the eastern regions requires an increase in the amount of rural construction and a rise in the level of industrialization and quality. Contracting construction organizations--primarily of RSFSR Minsel'stroy and Roskolkhozstroyob'yedineniye [RSFSR Association for Kolkhoz Construction] and other ministries and agencies--should do much to develop the production base. Simultaneously, measures must be taken to train and retain skilled worker personnel at rural construction projects.

The Krasnoyarsk conference will help to generalize experience in practical work on the reconstruction of villages of Siberia and the Far East, and to work out a plan of action for improving designs and the construction of the settlements of the sov-khozes and kolkhozes of these important regions of the country.

Rural Housing Status Nationwide

Moscow IZVESTIYA in Russian 9 Sep 81 p 3

[Article by Yu. Khrenov: "A New Village Is Being Built"; passages enclosed in slantlines printed in boldface]

[Text] During the past 15 years almost every other rural family has improved its housing conditions.

During the 10th Five-Year Plan housing that totaled 14.1 million square meters in area was introduced into operation in Nonchernozem Zone villages.

During the 11th Five-Year Plan capital investment for construction in the countryside of housing and of facilities for cultural and domestic-amenity purposes will be increased by 39 percent.

The changes that are occurring today in the appearance of our villages and hamlets, can, perhaps, be defined more precisely by the word, "renewal." During the last 15 years, capital investment in the social development of the Soviet village has been 56 billion rubles. This exceeds three-fourths of all the funds that the Soviet state has devoted to this purpose during the whole history of its existence.

This enormous financial backing has enabled housing, domestic-amenity and cultural construction in the countryside to proceed on an unprecedentedly wide scale.

/Since 1965 housing totaling more than 500 million square meters has been built at kolkhozes and sovkhoses, exceeding the housing inventory of all our country's cities in 1940./

During this same period, preschool institutions for 2.6 million children, general education schools for 12.8 million students, and clubs and palaces of culture with an overall accommodation capacity of 8 million persons have been put into operation.

A network of enterprises for domestic services and trade has been developed in the village. Sales volume for domestic services has grown 9-fold since 1965, and the sale of commodities by local stores per capita of the population has grown an estimated 2.6-fold.

Hundreds of types of standard designs for individual houses are being executed these days in villages and hamlets, and each year new ones appear. As a rule, any rural worker can select for himself that variant of housing that will most fully meet local conditions, traditions and his tastes.

Enormous creative work to gradually concentrate the rural population in promising hamlets and villages has been promoted. The number of small settlements is being reduced. Those rural communities that have been recognized as promising are being quickly consolidated and supplied with the amenities.

The July 1978 CPSU Central Committee Plenum and the 26th party congress set the task of supporting further development in the village of individual and cooperative construction that involves the use of the population's funds. Expansion of the capacity of housing-construction enterprises that are operating in the village have helped to solve this task successfully. The production of wooden houses of factory manufacture is to be brought up to 11 million square meters of total area per year by 1990, and the output of sets of wooden parts for houses with walls made of local building materials up to 12.2 million square meters. Simultaneously, it is planned to increase greatly retail inventories of sanitary-engineering items, electrical equipment, slate, glass, cement and other materials.

/The CPSU Central Committee and USSR Council of Ministers decree, "On Measures for Further Development of the Agriculture of the Nonchernozem Zone of the RSFSR," attributes special importance to the long-standing and complicated problem of the social restructuring of rural settlements, and the execution of large amounts of housing and public-building construction and the buildup of utilities and service lines and civic amenities for villages and hamlets of the Nonchernozem Zone./

Housing conditions for about 1.5 million persons have been improved during the 10th Five-Year Plan in the zone's villages and hamlets. A large number of schools, children's preschool institutions and other facilities for cultural, domestic-amenity and municipal purposes have been constructed.

Experimental villages and hamlets, which have become models of a sort for large-scale construction, are being created in all the Union republics. The conditions necessary for organizing services for the residents in the spheres of education, medicine, domestic services and leisure time activity have been provided in such villages and hamlets to the maximum. The advantages of rural and urban styles of life are being combined here in the best fashion. Each family, as a rule, receives a separate well-appointed house with a plot of land and outbuildings for household cattle, poultry and personal transport.

The architects are making a great contribution to the renewal of villages and hamlets. In Moscow Oblast, for example, many good rural settlements have been built. The Moscow Oblast ispolkom has identified another 82 central farmsteads which should be erected in the next few years.

One of the new rural settlements is Druzhba, at the central farmstead of the Nara Sovkhoz in Naro-Fominskiy Rayon. In undertaking its erection, the designers and architects were faced with the task of checking the various variants of houses and finding out which of them was the most suitable of all for life in a modern hamlet.

/In Druzhba, there is at each house a private plot less than 1 hectare in size, where an orchard, a kitchen garden and a flower bed are called for. Private-plot support buildings are grouped into units, which are placed outside the sections. Garages for private transport are either built at the houses or are grouped not far from them./

The layout of apartments built on two levels is very convenient. The kitchen, 10-13 square meters in area (depending upon the size of the family), the living room, a bath, the porch, and a private storeroom have been placed on the first floor. On the second floor are the bedrooms and the rooms with toilets. There are built-in closets and mezzanines, and in the cellars are places for storing potatoes and vegetables and feed for the household's animals and poultry.

The settlement has been built in such a way that all the houses are open to the sun, and around the settlement is a pine forest and apple orchards. In the opinion of sovkhoz workers, the homes are very comfortable and meet all the rural workers' requirements.

The circumstance that each house here has its own inimitable features--nonidentical facades and windows, different placement of rooms, kitchens, porches, and garages--imparts great picturesqueness to the settlement. Each apartment has electricity, gas, hot water and central heating.

Upon entry to the Druzhba cooperative, sovkhoz workers are given great advantages. Thus, a third of the payments are absorbed by the farm.

The architects and builders paid much attention to the amenities of the settlement's grounds. Lawns with flower gardens, retaining walls, modern luminaires, paths with concrete tiles--all these create a favorable living environment. There

are splendid children's squares equipped with wooden towers, swings and sculptured representations of wild animals and heroes of children's books. The family club, "Yelochka," is an interesting structure, built and shaped with great taste and inventiveness.

/"The way that we chose for renewing the village," says Nara Sovkhoz Director Anatoliy Yefimovich Shchigorets, "is suitable both for the farm and for its workers. In a short time, thanks to our cooperative, we managed to satisfy the housing requirements of more than half of those in need of housing. Now, out of the sovkhov's 25 hamlets, we intend to save 5, and each of the 5 will be transformed into a community similar to Druzhba. The construction of rural cooperatives will be of good help in solving the problem of retaining personnel in the village. No one will want to leave a settlement such as Druzhba to go to the city."/

There are rural settlements similar to Druzhba right now in literally all oblasts and republics. It is pleasant to visit, for example, Verkhnyaya Troitsa village in Kalininskaya Oblast, which was singled out for its civic improvements by the USSR Council of Ministers Prize, Il'inogorsk in Gor'kovskaya Oblast, Kuznetsovo and Voronovo, which are near Moscow, Sel'tso and Ospichevsk near Leningrad, and the village of Maysk in Permskaya Oblast. In the Ukraine there are Kalita near Kiev, Sebino near Nikolayev, and Uzlovoye in L'vovskaya Oblast. In Belorussia there are Vertelishki, Myshkovichi and Malech'. In Uzbekistan there are Karakalpak, Gul'shan and Karaksan. In Georgia there are Gudami and Cheremi. In Lithuania--Zhezhmaryay and Yuknaychyay....

Not only has the appearance of many of our villages changed but also the people who live in the village. While not so long ago a distinguishing feature of the traditional peasant way of life was the comprehensiveness of labor activity, scientific and technical progress in agriculture has now increasingly deepened and intensified professionalization of the work. Kolkhozes and sovkhoves now require workers of more than 150 vocations and specialties. The number of equipment operators has grown to 4.5 million persons--every fifth one of our rural workers today is an equipment operator.

Experience in renewal and the transformation of the hamlet that has been gained in recent years is great. It must now be spread everywhere. The creation of conditions for this is an important task of the soviets of people's deputies at all levels and a most important nationwide task. For it is primarily in the village, at kolkhozes and sovkhoves, that the success of the foodstuffs program that is being promoted in the country today is being and will be solved. Very much depends upon how rural workers live, how they work and how they spend their leisure time.

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CSO: 1821/014

CONSTRUCTION

COST OF HOUSING EXAMINED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 8, Aug 81 (signed to press 31 Jul 81) pp 57-66

[Article by V. Rutgayzer, director of the NIEI [Scientific Research Institute of Economics] department under USSR Gosplan, A. Malygin, director of the NIEI sector under USSR Gosplan and M. Ivanov, scientist at NIEI under USSR Gosplan: "Potentials for Reducing the Estimated Cost of Housing Construction"]

[Text] A vast social program is specified by the "Principal Directions for Economic and Social Growth in the USSR for the Years 1981 to 1985 and for the Period to 1990." Housing construction is an important element of it. The high level that was achieved for it during the past five-year plan is intended to be kept during the 11th Five-Year Plan which will depend on the effectiveness of developing the entire national economy and especially on improving the return on funds and the level of the results of using capital investments. Along with this improving the quality of planning, architectural and construction approaches and reducing the cost of building housing units remain large problems.

Improving the quality and level of comfort of housing will inevitably lead to a growth in the cost from the consumer effect; however, the improvement should surpass the growth in the cost of housing construction (the cost of one square meter of typical floor space increased somewhat during the 10th Five-Year Plan; 1.5 billion rubles of capital investments above the plan were allocated toward housing construction).

The increase in the cost of housing construction was caused by an improvement in the quality of new typical designs, an improvement in exterior and interior finish work, technical equipment, an increase in the proportion of housing units having all the necessary types of sanitary and technical conveniences; by an increase in the volume of housing construction in the village and also in newly developed regions of Siberia and the Far East; by including expenditures for facilities that are built in and built onto them for trade and public eating enterprises, kindergartens and nurseries, administrative facilities, etc. in the cost of building housing units.

The primary factors that were listed affect the growth in the cost of housing at the design or construction stage in one way or another. Consequently, it is necessary to separately analyze the conditions and results of the influences of the tendencies that have come about on the estimated cost, both during the process of working out the design and also at the stage that it is realized. When doing this the main thing is to uncover potentials for reducing the cost of construction.

At the present time state construction of housing units is done almost completely according to typical designs that are worked out and adopted by the USSR State Committee for Civil Construction and Architecture. Therefore, an analysis of the change in the composition of the housing units that have been built can give the most complete perception of the effect on the cost of housing of building it according to new typical designs. This composition, in turn, depends to a considerable degree on the composition of the proposed designs. This is why it is expedient to uncover the influence of the change in the composition of the new typical designs for housing construction that have been put to use on the growth of the estimated cost of housing.

For this aim data from 133 descriptive documents of typical designs for housing units that were put into use according to the conditions in 1970 and 196 according to the conditions in 1978 were researched by us. The tendency that was characteristic for the period being examined was basically preserved in subsequent years as well. An analysis has made it possible to determine that the estimated cost of building one square meter of typical housing floor space in 1978, based on the set of designs that were put into use, increased by 7 rubles or 6.7 percent in comparison with 1970. At the same time such an increase depends on two factors: a change in the specific make up of the set of designs (depending primarily on the number of stories) and the dynamics of the estimated cost of construction for the designs that are related to the same typological groups. Therefore, uncovering the degree of influence of each of these factors separately on the change in the estimated cost of housing construction is of interest (Table 1).

A change in the conditions of designing housing units during the years of 1970 to 1978 predetermined the overall increase in the estimated cost to a substantial degree. This is associated to a conclusive degree with the increase in the estimated cost of the designs for five- and seven-story housing units that were used more frequently. Their proportion of total floor space of the typical designs that were put into use in 1970 amounted to 61.4 percent, their total estimated cost amounted to 67.1 percent and the labor consumption by project amounted to 48 percent while it was 79, 77.4 and 77.8 percent in 1978, respectively. The proportion of individual typological groups of designs for housing units in the total make up of the designs that were approved during this period changed noticeably in its total floor space, its overall estimated cost and in its labor consumption by project.

An increase (by a factor of two) of the proportion of nine-story housing unit designs in the total make up of designs (based on the total floor space, the total estimated cost and the labor consumption by project) is the chief characteristic of the change in the composition of the set of housing unit designs that were put into use in 1978 in comparison with 1970 if one disregards the appearance of multi-storied housing unit designs by 1978. The relative proportion of all the remaining designs was reduced. The change in the composition of the designs is evident from Table 2.

And so, first of all, an increase occurred in the estimated cost of construction for the typical designs for housing units from 1970 to 1978 based on one square meter of typical floor space for all the typological groups of designs that were recommended for use. Secondly, within the bounds of the designs for housing units that were put into use the proportion of the group of nine-story housing units increased at the expense of the remaining typological sets (without considering the designs for multi-storied housing units). The most substantial increase in the design estimated cost

TABLE 1

THE CHANGE IN THE ESTIMATED COST OF BUILDING HOUSING UNITS ACCORDING TO
INDIVIDUAL TYPOLOGICAL GROUPS FOR THE PERIOD FROM 1970 TO 1978
(BASED ON ONE SQUARE METER OF GENERAL FLOOR SPACE IN RUBLES)

Group of Designs, Number of Stories	1970	1978	Increase + Decrease -
1	115	156	+41
2	110	122	+12
3	102	95	- 7
4	120	118	- 2
5	100	114	+14
8	--	113	--
9	93	109	+16
12	--	122	--
14	--	126	--
16	--	120	--
TOTAL:	105	112	+ 7

TABLE 2

THE CHANGE IN THE COMPOSITION OF THE DESIGNS FOR HOUSING UNITS ADOPTED IN 1978
IN COMPARISON WITH THOSE ADOPTED IN 1970 (IN PERCENT)

Group of Designs, Number of Stories	Change (increase +, decrease -) in the Relative Proportion of Each Group of Designs in the Set of Designs Adopted According to		
	Total Area	The Total Estimated Cost of Construction	Total Labor Consumption by Project
1	- 3.5	- 3.9	- 5.2
2	- 4.1	- 4.6	- 5.4
3	- 1.8	- 2.0	- 1.9
4	-15.2	-18.0	-24.5
5	-13.4	-11.2	- 1.3
8	--	--	--
9	+31.0	+31.5	+31.1

of construction per one square meter of typical floor space was characteristic of this group, excluding the group of designs for one-story housing units that were not widely used.

At the same time the fact that the cost of one square meter of typical housing floor space in nine-story housing units is lower than for other types draws attention. Consequently, the growth in the proportion of these designs in the total set affected the change in the average cost of one square meter of the housing that was put into use for all the projects in two ways. The greatest growth in the cost of one square meter of typical floor space was observed for the above typological group of designs. The average cost changed correspondingly in the direction of an increase. An increase in the proportion of housing units in this group of the entire set of designs, on the other hand, reduced the average cost of housing. The total effect of the above factors on the change in the cost of one square meter of typical floor space was characterized by the following data (Table 3).

Thus, a change in the composition of the typical designs promoted a reduction in the estimated cost of construction which, however, was matched by quite a substantial increase in it (per one square meter of typical floorspace) associated with a corresponding change in the designs themselves that was brought about by the attempt to provide higher qualitative properties for housing. Higher expenditures are the result of this which are not completely compensated for by an expedient change in the specific composition of the set of typical designs and the processes of making state housing construction efficient. Some of the increase in the estimated cost of building housing units according to typical designs associated with adopting new designs in 1978 is explained by the approval of a number of new high rise designs having a higher relative cost for the useful housing floor space. This already caused an increase in the estimated cost per one square meter of typical floor space at the design stage.

A further increase in the estimated cost already occurred when implementing the approved designs, i.e., during the process of construction. Evidently, the main reason for the growth in the cost of one square meter of typical floor space for the fixed set of designs that were adopted was due to the fact that the actual cost of housing for each type of housing unit exceeded the design cost. This can be illustrated by the following data.

In 1970 the estimated cost of one square meter of typical floor space in the housing units that were put into use amounted to 126 rubles and in 1978, 164, i.e., 38 rubles more. A portion of the increase, limited to seven rubles, can, as was shown above, be related to the change in the estimated cost of construction at the design stage. The remaining sum--31 rubles--arises due to the fact that the actual cost of one square meter substantially exceeded the projected cost for the typical designs that were recommended and used.

This tendency was also characteristic for state housing construction earlier. For example, in 1970 the gap between the estimated cost of construction for the housing units being put into use and their designs that were used reached 21 rubles (126 rubles - 105 rubles) based on 2 square meters of typical floor space which amounts to 20 percent of the estimated cost of the designs while in 1978 it reached 52 rubles (164 rubles - 112 rubles) or 46.4 percent of their estimated cost.

TABLE 3

THE RELATIONSHIP OF THE EFFECT OF INDIVIDUAL FACTORS ON THE CHANGE IN THE ESTIMATED DESIGN COST OF CONSTRUCTION FOR TYPICAL HOUSING UNITS DURING THE PERIOD FROM 1970 TO 1978 (in rubles)

Individual Factors	Change in the Cost of Building Housing Units According to Typical Designs (increase +, decrease -)
The effect of the change in the specific composition of the set of typical designs--total.....	- 5
In particular because of:	
A change in the composition of the set of typical designs that were in use in 1970 and in 1978.....	- 6
The adoption of new designs in 1978.....	+ 1
The effect of the change in the estimated cost of construction for housing units based on designs that were taken separately (per one square meter of typical floor space).....	+12
Total	+ 7

TABLE 4

THE EFFECT OF DISTRIBUTIONAL AND REGIONAL FACTORS ON THE CHANGE IN THE COST OF ONE SQUARE METER OF TYPICAL HOUSING FLOOR SPACE DURING THE 10TH FIVE-YEAR PLAN (in rubles)

Individual Factors	Change in the Cost of One Square Meter of Typical Housing Floor Space (Increase +, Decrease -)		
	For the Five-Year Plan	Actual*	
		In All	In Particular Due to a Deviation from the Plan
The effect of the change in the relative proportion of housing construction in the regions of the Far East, Siberia and also rural areas.....	+1.7	+ 2.0	+ 0.3
In particular due to housing construction:			
In regions of Siberia and the Far East.....	+0.8	--	- 0.8
In rural areas.....	+0.9	+ 2.0	+ 1.1
The effect of an increase in the cost of construction in regions of Siberia, the Far East and also rural areas....	+4.4	+15.0	+10.8
In particular due to a cost increase:			
In regions of Siberia and the Far East	+3.2	+ 8.0	+ 4.8
In rural areas.....	+1.2	+ 7.0	+ 5.8
The effect of an increase in the cost of construction in other regions of the country (excluding Siberia, the Far East and rural areas).....	-0.1	+ 0.5	+ 0.6
Total--Cost increase.....	+6.0	+17.5	+11.5

*Based on calculations by the authors.

Exceeding the projected cost of housing construction due to the various reasons brought about an increase in the estimated cost from 1970 to 1978 of approximately 4 rubles annually (52 rubles - 21 rubles = 31 rubles based on 8 years). Expenditures for laying main utility lines and roads in the regions of the individual construction projects and for improving the grounds, limited expenditures, and an increase in expenditures in a number of cases for the foundation work that were determined after typical designs were assigned must be related to the reasons for this. However, they cannot exceed the projected expenditures by more than a factor of four revealed by our calculations.

Thus, serious economic reasons exist that cause an increase in the estimated cost of housing units at their design and construction stage. Eliminating them, we feel, requires, first of all, that planning supervision over general state typical designs be perfected.

Designers traditionally explain the increase in the estimated costs of designs per one square meter of typical floor space by the improvement in the quality of the typical housing units that are recommended. However, at the present time methods of equating the total result of improving the quality of designs with the additional expenditures for these goals have not been perfected. At the present time it is impossible to determine exactly to what degree the above expenditures lead to a total change in the quality of housing units since a method of equating the quality of the housing that has been put into use with the consumption of resources in housing construction has still not been worked out. Only separate evaluations for various parameters of improved designs exist which are compared with those that were used previously. The results of the change in the entire set of designs for housing units are taken as data in the state plan. And only the degree that this or that design is propagated is regulated with the help of the planning goals.

A method that makes qualified measurements of generalized evaluations of the many qualitative characteristics in designs for housing units, which is based on an approach to the quality of housing as a hierarchical set of features that are different in their importance to the consumer, is being worked out by NIEI under USSR Gosplan. The priority level of each feature is determined which makes it possible for experts and specialists in the urban development field to qualitatively evaluate the total set of features in housing that cannot be directly equated and vary in quality and quantity. An evaluation is done with the help of relative indices (points) on a 100-point scale depending on the number of features that characterize the quality of the projects that are being analyzed and also by starting with the specific social, demographic and regional conditions under which the appropriate variations are being examined.

A summary social effect that takes into consideration the varying qualitative features (P_{ij}) is determined by the numerical evaluations (B_i) that have been established by the method of using experts and is expressed by the magnitude of $\sum_{i=1}^n B_i Y_{ij}$ where Y_{ij} is the relative proportion of the magnitude of the i th feature for the j th variation of the total sum of the i th feature for all the variations that are being examined, i.e.:

$$\frac{P_{ij}}{\sum_{i=1}^n P_{ij}}$$

For each given equation a constant set of features and constant numerical evaluations for each feature are used. As a result $B_i = \text{constant}$ and $\sum_{i=1}^n B_i X_i = 100$ percent for each given equation. The variant with the minimum value for the listed expenditures per unit of summary social effect is considered to be the best:

$$\frac{C + EK}{\sum_{i=1}^n B_i r_{ij}} = \min.$$

The above method will make it possible to regulate the progressive process of improving the quality of the housing units being designed within the limits of the planned goals.* With these goals it is necessary, in our opinion, to form a commission of experts under USSR Gosstroy or the Main Administration of State Experts under USSR Gosstroy to make qualitative evaluations. Such work should be done once a year. It basically comes down to a one-time qualified measurement evaluation of the typical designs for housing units. In the future the set of evaluations will be supplemented every year by newly worked out designs.

It is also necessary to improve the economic mechanism in state housing construction in order to give construction workers incentive to reduce the cost of work. At present they are attempting to put more expensive designs into use since their wages and bonuses directly depend on the amount of work they complete. The result of this is that the projected estimated cost of building housing units per one square meter of typical floor space is exceeded. Evidently, conditions must be created that eliminate such aberrations. The fact that the planned projections for the change in the estimated cost in cooperative construction that were set for the five-year plans are being met as a rule and, even more than that, some savings were observed during the 9th and 10th Five-Year Plans, testifies that there is a real large potential for regulating the consumption of resources in housing construction.

As is well known, more than half of the financing for cooperative housing construction is done by means of USSR Stroybank loans. Therefore, an increase in the cost of the housing that is erected must automatically result in an increase in corresponding credits by USSR Stroybank. In addition, approximately two-fifths of the cooperative construction is financed by means of personal funds. This also puts substantial limits on the consumption of funds.

At the same time those that order housing—state organizations—not encountering such obstacles and having the necessary funds available, willingly revise the estimates of the designs in the direction of an increase. Such a situation can be corrected only by perfection of the economic mechanism. In particular we think that long-term credit for state housing construction (completely or partially within the framework of housing construction cooperation) ensures more efficient regulation of the resources that are allocated.

The cost of one square meter of housing in cooperative construction acts as an element of its retail price. Since the latter is subject to the laws of monetary exchange even under the conditions of a planned economy it feels the effect of the

* See for more detail "Methods of Determining the Effectiveness of Capital Investments" "EKONOMICHESKAYA GAZETA" 1980, No 1, 2.

ability to pay and demand, it is determined in a number of cases by many social factors and it cannot increase arbitrarily. Its quality becomes an extremely rigid framework for the growth in the cost of housing construction also.

An examination of the change in the cost of one square meter of typical housing floor space under the influence of, for example, distributional and regional factors is, in our opinion, of unquestionable interest. An attempt was made by us to evaluate the effect of regional improvements in state housing construction and the expansion of construction in rural areas on the change in the estimated cost of housing for 1976 to 1980. The actual deviation in the cost of one square meter of its typical floor space from the planned projections was calculated. The analysis that was done made it possible to evaluate the degree of the effect of the above mentioned factors on the total change in the cost of one square meter of housing (Table 4).

From Table 4 it is evident that a change in the relative proportion of housing construction for regions of Siberia, the Far East and rural areas, both according to the plan and also in actuality, does not significantly affect the total increase in its cost. Where an equal effect of the change in the distribution on the cost of one square meter of housing was estimated in the plan for these regions (0.8 and 0.9 rubles, respectively) this did not actually happen. It occurred only due to a change in the relative proportion of housing construction in rural areas and to an even greater degree than was outlined by the plan.

An increase in the cost of one square meter of typical housing floor space was not specified by the five-year plan for the regions other than Siberia, the Far East and rural areas. Actually an insignificant cost increase is being observed for these regions. The data in Table 4 testify to the fact that the total increase in the cost of one square meter of typical floor space during the years of the 10th Five-Year Plan amounting to 17.5 rubles (or 11.5 rubles greater than according to the plan) occurred mainly as a result of the increase in the cost of construction in the regions of Siberia, the Far East and rural areas (15.5 rubles) where the greatest growth in the cost of one square meter of typical floor space was indeed planned. It is actually substantially higher in these regions. The highest cost for one square meter of housing occurs here both as per the plan and in actuality. For example, the cost of one square meter in 1980 in the regions of Siberia and the Far East amounted to 275 rubles which exceeds the average cost of one square meter for the country this year by 90 rubles and it is 197.7 rubles for regions in rural areas which exceeds this indicator by 12.7 rubles on the average for the country.

And so the total planned growth for 1980 in the cost of one square meter of typical floor space, amounting to 6 rubles, was exceeded by 11.5 rubles which was basically caused by a deviation in the actual cost of construction from the planned projections for the regions of Siberia, the Far East and rural areas and also by faster rates of building housing in rural areas than were planned.

The use of heavy precast reinforced concrete components to an ever greater degree, an increase in the profits and returns for contract construction organizations without a reduction in the cost of the physical volumes of construction and installation work and the further expansion of precast reinforced concrete construction in remote northern regions of the country and rural areas lie, in our opinion, as the basis of the increase in the actual cost of one square meter of typical floor space in housing units.

The development of capacities for producing precast reinforced concrete components and an increase in their relative proportion of the structural materials, which are continuing in our country, provide a basis for assuming a further increase in the cost of construction per unit of floor space in a building (Table 5).

As is evident from Table 5, along with a growth in the production of precast reinforced concrete whose primary component is cement, the production of cement per one million rubles of construction and installation work is declining. Despite the fact that at the present time successes in the technology of brick production have made it possible to increase labor productivity in the sector while the use of reusable and flying forms, concrete pumps and other advanced method of doing concrete work have improved the national economic effectiveness of monolithic components in comparison with precast ones, the technical policy continues to be the old one. The production and use of precast reinforced concrete, the level of prefabrication for various sectors of construction, etc. are considered to be among the main indicators of technical progress in construction. The capacities that are in operation in the construction industry are proving to exert substantial pressure on the selection of design approaches since the coefficient of use of the capacities is low.

Therefore, expansion of the use of monolithic frames for housing units and also building brick housing units is an important potential for reducing the cost of housing construction. It is also necessary to implement a set of measures that is aimed at reducing the weight of buildings, for example, by constructing housing units from cinder block and ceramic blocks.

The above listed factors in the growth of the cost of one square meter of typical floor space for housing units that have an effect during the design and construction stage owing to an imperfection in the economic mechanism were expressed in the final result as a discrepancy between the amount of state capital investments and the amount of housing that was put into use during the 10th Five-Year Plan (Table 6).

And so it was observed that the plan for state capital investments was exceeded for the period being examined and the amount of typical floor space that was put into use was underfulfilled. The fact that the greatest underfulfillment of the plan for putting typical floor space into use occurred when building in rural areas especially attracts attention. It was exceeded in the regions of Siberia and the Far East, though not by as much as the plan for state capital investments.

The discrepancy between the amount of state capital investments and the amount of typical floor space in housing units that was put into use could have been avoided if the economic mechanism was oriented toward ensuring a growth in labor productivity for construction workers and toward giving them incentive to use such designs for housing units that are characterized by the use of relatively cheaper material resources. As a result the increase in the cost of construction was not compensated for by an improvement in labor productivity.

The typical designs for housing units that were worked out and approved from 1970 to 1978 foresaw a certain reduction in labor consumption by project (Table 7). But the actual consumption of labor for the set of designs for housing units that were approved during this period did not decrease.

TABLE 5

THE PRODUCTION OF BUILDING COMPONENTS AND MATERIALS PER ONE MILLION RUBLES OF CONSTRUCTION AND INSTALLATION WORK

Building Material	1965	1970	1975	1979
Precast reinforced concrete, thousands of cubic meters.....	1.58	1.70	1.72	1.75
Building bricks, millions of pieces.....	1.03	0.86	0.71	0.61
Cement, thousands of tons.....	2.04	1.91	1.84	1.78
Window glass, thousands of square meters.....	5.40	4.60	4.10	3.70

TABLE 6

THE AMOUNT OF STATE CAPITAL INVESTMENTS AND THE AMOUNT OF TYPICAL FLOOR SPACE THAT WAS PUT INTO USE IN HOUSING UNITS DURING THE 10TH FIVE-YEAR PLAN

	1976 to 1980		%
	Five-year plan	Actual*	
The total amount of state capital investments, millions of rubles.....	65,622.4	68,835.6	104.9
Of those:			
In regions of Siberia and the Far East.....	13,905.0	14,554.9	104.7
In rural regions.....	14,142.0	14,559.9	103.0
Excluding the regions of Siberia, the Far East and rural areas.....	37,575.4	39,720.8	105.7
Total typical floor space that was put into use, millions of square meters.....	386.8	381.6	98.7
In particular:			
In regions of Siberia and the Far East.....	56.2	58.2	103.6
In rural regions.....	78.0	73.2	93.9
Excluding the regions of Siberia, the Far East and rural areas.....	252.6	250.2	99.1
*Based on calculations by the author.			

TABLE 7

THE CHANGE IN THE CONSUMPTION OF LABOR BY PROJECT ACCORDING TO THE TYPOLOGICAL GROUPS OF DESIGNS FOR HOUSING UNITS IN 1970 TO 1978 BASED ON ONE SQUARE METER OF TYPICAL FLOOR SPACE (in man days)

Group of Designs, Number of Floors	1970	1978	Change (Increase +, Decrease -)
1	5.81	4.19	-1.62
2	4.70	2.68	-2.02
3	3.39	1.99	-1.40
4	5.65	2.52	-3.13
5	3.19	2.73	-0.46
8	--	1.82	--
9	2.91	2.06	-0.85
12	--	1.90	--
14	--	2.85	--
16	--	1.86	--
Total	3.95	2.29	-1.66

A total reduction in the consumption of labor by project for the typical designs for housing units that were used occurred as a result of a change both in their composition and also the characteristics of labor consumption for the designs that were taken separately.

However, labor consumption by project is only a portion of the total consumption of labor for erecting housing units. A substantial portion of it takes place at housing construction combines. A systematic account by USSR TsSU [Central Statistical Administration] of general labor expenditures per one square meter of typical floor space in housing units is lacking. These expenditures are determined by means of random inspections. For example, inspections were conducted in 1978 that encompassed about 4,000 men or 0.2 percent of those engaged in housing construction. In addition, the expenditures of subcontract and transportation organizations whose workers are not on the labor force listed for a housing construction combine were not considered in the total labor expenditures. As a result expenditures fall during foundation work, when improving the grounds, installing elevators, transporting materials and others.

The data given in Table 7 for projected labor consumption by project do not reflect actual labor consumption, but would be more complete by considering plants' labor consumption. It can be assumed that the latter is gradually increasing which is indicated by the stability in the proportion of wages of the total amount of construction and installation work (despite an increase in the wages of construction workers) in state housing construction for all the years of the period being examined.

Such a tendency also testifies to the stability of the relative proportion of the remaining portion of expenditures, chiefly materials. This means that an increase occurred for the period being examined in the consumption of labor by plants and in the wages for the labor that was engaged in state housing construction in approximately the same amount as an increase was registered for the consumption of materials for this construction.

Thus there was no trade off here for the additional consumption of materials that was brought about by erecting housing units according to improved designs by a reduction in the consumption of labor in construction. All of this caused an increase in the estimated cost of construction for housing units during the period from 1970 to 1978, both during the design stage due to an improvement in the quality of the housing being designed and also during the implementation of the designs as a result of the economic mechanism's effect on construction.

Reducing the cost of construction for projects that are not in the production sphere is an important economic and social goal. Its solution depends to a substantial degree on efficiently using the means that are allocated for building housing, ensuring a high technical and economic standard for the designs and correctly determining the estimated cost of construction. All of this will aid in maintaining the high standard of housing construction that has been achieved in our country.

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CSO: 1821/010

CONSTRUCTION

RECOMMENDATIONS ON PLANNING MACHINE USE IN CONSTRUCTION PRESENTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 35, Aug 81 pp 17-18

[Article: "Temporary Methodological Recommendations on Defining and Planning the Development of the Production Capacities of Construction and Installation Organizations"]

[Text] USSR Gosplan, USSR Gosstroy, and the USSR Central Statistical Administration have developed the "Temporary Methodological Recommendations on Defining and Planning the Development of the Production Capacities of Construction and Installation Organizations." These methodological recommendations are intended as a model in conformity with which ministries and departments may develop and, with the consent of USSR Gosstroy and USSR Gosplan, ratify departmental methodological instructions on how to define the production capacities of construction and installation organizations, reflecting the specific features of the work of particular ministries and construction organizations. It is being kept in mind here that experience with calculating the production capacities of construction and installation organizations using the methodology recommended by USSR Gosplan, USSR Gosstroy, and the USSR Central Statistical Administration, as well as other methodologies, will be reviewed when this work is summarized for the purpose of formulating uniform Model Methodological Instructions.

The present methodological recommendations are designed to define and plan the production capacities of the primary cost accounting unit of construction production: the construction-installation production association (construction trust or construction-installation trust).¹ They were developed to elaborate the basic principles contained in the corresponding section of the Methodological Instructions for Development of State Plans of Economic and Social Development of the USSR, ratified by decree No 63 of USSR Gosplan, dated 31 March 1980.

¹ Referred to hereafter as "association" and "trust."

1. General Principles

1.1. The term "production capacity of an association" (or a trust) means the maximum possible annual volume of construction and installation that can be done by the personnel of its organizations with the appropriate (actual for the base year and planned for a planning year) structure of construction and installation work and production units on the condition that the construction machinery and labor resources at the disposal of the organization (including specially assigned) are fully used in conformity with the established work regime.²

1.2. The production capacity of an association (or trust) is defined by the estimated cost of construction and installation work.

Production capacity may also be defined in natural measures of construction output for some construction organizations, as a rule narrowly specialized ones that produce a single type of output.

1.3. The production resources included in the calculation of the production capacity of an association (or trust) comprise the machine resources (the principal construction machines and mechanisms) and the labor resources.

1.4. Full use of the production resources at the disposal of the association (or trust) means the absence of losses of their working time. Losses of working time resulting from disruptions in the supply of building materials, elements, and parts to the association (or trust), shortcomings in the organization of labor, production, and management, unproductive expenditures, or failure to coordinate production units are considered in the calculations as factors that influence the level of use of production capacity.

1.5. The availability and level of use of the principal construction machines and mechanisms (carried on the balance of the association and specially assigned from outside organizations) are taken into account in defining the production capacity of an association (or trust). "Principal machines" are the machines and mechanisms employed in construction and installation and considered to comprise the basic production capital for construction purposes, that which performs the bulk of the mechanized construction and installation work.

The list of principal construction machines and mechanisms included in the determination of production capacity is made up and consented to by the ministry (department) to which the association (or trust) belongs.

1.6. The labor resources in the calculation of the production capacity of an association (or trust) are defined by the number of workers (regular personnel and those specially assigned from outside organizations) employed in construction and installation, with the exception of machine operators and their assistants.

² The procedure for determining potential annual volume of work for the general contract is presented in the appendix.

1.7. The figure adopted in the calculation of production capacity for production resources (machine and labor) assigned from other organizations must be coordinated with these organizations.

1.8. To insure balance between the volume of construction and installation work and the production capacity of the association (or trust) it is necessary:

- a. to determine the actual production capacity;
- b. to determine the planned production capacity necessary to perform the planned volume of construction and installation work;
- c. to plan the development of production capacity.

2. Determining Actual Production Capacity

2.1. The actual production capacity of an association (or trust) is defined as the average annual figure and the figure at the end of the base year.³

2.2. The calculation of actual average annual production capacity is made to estimate the level of use of production capacity in the base year in order to work out measures to raise this figure and to complete the passport of the construction-installation production association (or trust).

2.3. The calculation of actual production capacity at the end of the base year is made to evaluate the actual production potential at the start of the period being planned, to determine the need to build up production capacity, and to complete the passport of the construction-installation production association (or trust).

2.4. The actual average annual production capacity of the association (or trust) is determined according to the actual structure of construction and installation work and the production units of the organization in the base year, beginning from the average annual availability of production resources and manner of their use.

2.5. The actual average annual production capacity (M_ϕ) is calculated by an adjustment of the volume of construction and installation work actually performed in the base year by the association's (or trust's) own personnel (O_ϕ), taking into account available reserves in the use of production resources (machine and labor).

The calculation is done according to the formula

$$M_\phi = O_\phi \left(\frac{m}{K_m} + \frac{1-m}{K_r} \right), \quad (1)$$

³ The term "base year" here means the report year, that is the year before the planning year.

where K_M and K_T are coefficients of the use, respectively, of machine and labor resources at the disposal of the organization; m is the proportion of work done by mechanized means in the total volume of construction and installation work actually performed, as a decimal fraction.

2.6. The coefficients of the use of machine and labor resources at the disposal of the association (or trust) are determined by special-purpose calculations based on figures from statistical reporting, selective surveys, and other materials that describe the use of these resources over time.⁴

2.7. The coefficient of use of machine resources at the disposal of the association (or trust) is determined for each group of principal construction machines and mechanisms. The magnitude of this coefficient for a group of similar machines (K_{M1}) is determined according to this formula:

$$K_{M1} = (1 - K_{M1}) \cdot (1 - K_{B1}), \quad (2)$$

where K_{M1} is the coefficient of full-shift losses of machine time for group No 1 of principal construction machines and mechanisms resulting from full-shift downtime at the construction site, in decimal fractions⁵; K_{B1} is the coefficient of losses of working time within a shift for group No 1 of principal construction machines and mechanisms at the construction site, in decimal fractions.

The coefficient of use of all construction machines and mechanisms (K_M) is calculated as the average weighted coefficient of use of the particular groups of K_{M1} :

$$K_M = \frac{\sum K_{M1} 3_i}{100}, \quad (3)$$

where 3_i is the calculated cost of the machine-hours worked by group No 1 of principal machines and mechanisms as a percentage of the total cost of machine-hours worked at the sites of the association (or trust).

The calculated cost of machine-hours worked by group No 1 of the principal machines and mechanisms is determined by multiplying the average annual number of machines in the group by the average number of hours of work of one machine and the calculated cost of one machine-hour adopted in the plan.

⁴ Use of data from selective surveys (photographs of the working day, time and motion studies) imposes higher requirements for reliability, periodicity, and representation. It is recommended that when programs of studies are being worked out a rational ratio be envisioned among studies of the different groups of construction machines and workers and also for different types of construction projects and jobs.

⁵ Full-shift time losses owing to weather conditions, moving operations, and mechanical maintenance and repair are not considered in determining coefficient K_{M1} , that is, they are not included in the planned annual sum of machine work time.

Where the organization does not have adequately complete information on the use of construction machines and mechanisms for full shifts and within shifts the calculation of coefficient K_M can be done based on the indicators of full-shift and within-shift losses of the annual sum of working time of machine operators and their assistants. In this case, the calculation procedure is similar to calculating the coefficient of use of labor resources (K_T), not taking into account the particular occupational group of employees.

2.8. The coefficient of the use of labor resources available to the association (or trust) is determined by the formula:

$$K_T = (1 - K_{\text{full}}) \cdot (1 - K_{\text{shift}}). \quad (4)$$

where K_{full} is the coefficient of full-shift losses of the annual sum of working time owing to downtime and absences, in decimal fractions; K_{shift} is the coefficient of losses of the annual sum of work time within shifts, in decimal fractions.

These coefficients are determined for all occupational groups of workers employed in construction and installation work with the exception of machine operators and assistants, whose workload is considered in determining the degree of use of machinery and mechanisms.

2.9. The proportion of work done by mechanized means (m) in the total volume of construction and installation actually done is calculated by the formula:

$$m = (\sum_j O_{mj} \cdot C_{mj}) : (\sum_j O_j \cdot C_j). \quad (5)$$

where O_j and O_{mj} are the total volume of work of type j performed by the organization's own personnel and the volume performed by mechanized means, in units of physical work volume⁶; C_j and C_{mj} are the average estimated cost figures for the total physical volume of work of type j and the volume done by mechanized means, in rubles.

The calculation based on formula (5) must include the primary types of construction and installation work which, taken together, make up at least 70 percent of the estimated cost of the volume of construction and installation work done by the organization's own personnel.

In the absence of information on the volumes and estimated cost of mechanized work (by types) and data for consolidated and long-range calculations, the indicator m is taken as equal to the proportion (as a fraction) of the growth in labor productivity resulting from factors related to the mechanization of construction in the total growth of labor productivity adopted in the calculation for the labor plan of the association (or trust).

⁶ The physical volumes of construction and installation work singling out the volume done by mechanized means are taken from statistical reporting data on form No 1-nt (Construction) "Report on the Mechanization of Construction and Use of Construction Machinery."

2.10. The actual production capacity of the association (trust) at the end of the base year is determined: by the structure of construction and installation work that actually occurred in the base year ($M_{\phi K}$); by the planned structure of construction and installation ($M_{\phi Kc}$).

2.11. The actual production capacity at the end of the base year (in the structure of work that in fact took shape during the base year) is determined by adjusting the actual average annual production capacity (M_{ϕ}), beginning from the availability of machine and labor resources in the organization as of the end of the base year.

The calculation is made according to the formula:

$$M_{\phi z} = M_{\phi} \cdot \frac{m \cdot T_{mk} + (1 - m) \cdot T_{rk}}{100}, \quad (6)$$

where T_{mk} is the total technical capacity of the organization's stock of machinery at the end of the base year as a percentage of the average annual capacity (where these data are not available the number of machine operators and assistants at the end of the base year as a percentage of the average annual number may be used); T_{rk} is the number of workers employed in construction and installation (with the exception of machine operators and their assistants) as of the end of the base year, as a percentage of the average annual number.

The indicator T_{mk} is calculated according to the formula

$$T_{mk} = \frac{\sum T_{mk1} 3_i}{100}, \quad (7)$$

where T_{mk} is the technical capacity⁷ of group No 1 of principal machines and mechanisms as of the end of the base year, as a percentage of average annual capacity.

2.12. The actual production capacity at the end of the base year in the planned structure of construction and installation work ($M_{\phi Kc}$) is determined according to the formula:

$$M_{\phi zc} = M_{\phi z} \cdot K_c, \quad (8)$$

where K_c is a coefficient that takes account of change in the planned structure of work in comparison with the structure of work in the base year.

In conformity with the specific features of a construction organization, during calculation of the coefficient K_c consideration is given to changes in the type and sectorial structure of construction and installation work being done.

⁷ The technical capacity of the stock of principal machines and mechanisms is accounted for in the units of measure adopted in statistical report forms (form No 1-nt, 12-s).

The calculation is made according to the formula:

$$K_s = \frac{\sum_j O_{sj} \cdot \Pi_{sj} \cdot a_j}{\sum_j O_{sj}} : \frac{\sum_j O_{sj} \cdot a_j}{\sum_j O_{sj}}, \quad (9)$$

where O_{sj} is the volume of work of type j (type of construction) done by the organization's own personnel in the base year, in thousands of rubles; Π_{sj} is actual labor expenditures per 1,000 rubles of work of type j (type of construction) in base year, worker-days; and a_j is the coefficient of growth of work of type j (type of construction) in the planning year.

2.13. The coefficient of use of the production capacity of the association (or trust) in the base year (N_0) is determined by the ratio of the annual volume of construction and installation work actually performed (O) and the actual average annual capacity (M_0):

$$N_0 = O_0 : M_0 \quad (10)$$

3. Procedure for Planning the Development of Production Capacity

3.1. The development of the production capacity of the association (or trust) is planned on the basis of the determination of planned production capacity.

3.2. The calculation of the planned production capacity of the association (or trust) is made for the purposes of:

- a. insuring balance between the program of construction and installation work and the production resources of the organization;
- b. determining the need for development of the organization's production capacity;
- c. evaluating the intensity of the organization's plan;
- d. completing the passport of the construction-installation production association (or trust).

3.3. The calculation of planned production capacity and the level of use of this capacity is done during development of the five-year plan of economic and social development of the association (or trust) with a breakdown of assignments by year. The annual assignments of five-year plans with respect to the quantity and level of use of production capacity are taken into account in writing annual production-economic plans (construction finance plans), summarizing the results of their performance, and completing the passport of the construction organization. These refinements may be made on the basis of the results of fulfillment of the previous year's plan, in connection with specification of figures for the receipt and withdrawal of principal production resources, or based on the results of steps taken to improve the use of these resources.

3.4. The planned average annual production capacity of the association (trust) is determined on the basis of developing a plan balance for production capacity.

3.5. The production capacity balance of the association (or trust) for the planning year is compiled according to the formula:

$$M_{\pi} = M_{\phi\kappa c} + \Delta M_{\mu} \pm \Delta M_{\mu} \pm \Delta M_{\tau}, \quad (11)$$

where M_{π} is the planned average annual production capacity; $M_{\phi\kappa c}$ is the actual construction capacity at the end of the base year in the planned structure of construction-installation work; ΔM_{μ} is the growth⁸ of production capacity through intensive factors; ΔM_{μ} is the growth⁸ of production capacity through change in supplying the organization with construction machines and mechanisms; ΔM_{τ} is the growth⁸ of production capacity by change in the number of workers employed in construction and installation jobs.

3.6. The growth in the organization's production capacity through intensive factors (ΔM_{μ}) is calculated on the basis of measures in the plan for technical development and raising the efficiency of construction through the following technical-economic factors:

- a. increase in the average hourly productivity of the principal construction machines and mechanisms, not related to decreasing losses of machine time within a shift⁹;
- b. increase in the actual annual sum of working time of the principal machines and mechanisms;
- c. increase in the average hourly productivity of labor of workers employed in construction and installation jobs, not related to decreases in losses of working time⁹;
- d. increase in the annual sum of working time of workers employed in construction and installation jobs.

The calculation is made according to the formula:

$$\Delta M_{\mu} = \frac{M_{\phi\kappa c} \cdot \Pi_{\tau\pi}}{100}, \quad (12)$$

where $\Pi_{\tau\pi}$ is the planned rate of growth of the labor productivity of workers employed in construction and installation jobs as envisioned by the plan for technical development and raising the efficiency of construction, as a percentage.

⁸ With a minus sign (-) indicates a decrease.

⁹ This decrease is taken into account in the calculation of the planned level of use of production capacity.

3.7. Growth in production capacity through changes in the construction machinery and mechanisms supplied to the organization (ΔM_m) is calculated on the basis of figures on planned change in the number and technical capacities of the principal machines using the formula:

$$\Delta M_m = \frac{M_{\text{base}} \cdot m \cdot (T_{\text{MT}} - 100)}{100}, \quad (13)$$

where T_{MT} is the average annual technical capacity of the stock of principal construction machines and mechanisms (including specially assigned ones) in the planning year as a percentage of the technical capacity of the organization's stock of machinery at the end of the base year.

The indicator T_{MT} is calculated in a manner similar to that defined by formula (7).

In the absence of data on change in the average annual technical capacity of the stock of construction machines and mechanisms during the planning period, the indicator T_{MT} can be provisionally taken as equal to the average annual number of machine operators and their assistants (including those specially assigned from outside organizations) in the planning year as a percentage of the number at the end of the base year.

3.8. Growth in production capacity through change in the number of workers employed in construction and installation jobs (ΔM_r) is calculated on the basis of figures on planned change in labor resources using the formula:

$$\Delta M_r = \frac{M_{\text{base}} \cdot (1 - m) \cdot (T_{\text{r}} - 100)}{100}, \quad (14)$$

where T_{r} is the average annual number of workers employed in construction and installation jobs (with the exception of machine operators and their assistants), including specially assigned workers, in the planning year as a percentage of the number at the end of the base year.

3.9. The correspondence between the construction-installation program being planned and the planned production capacity of the association (or trust) is characterized by the balance coefficient ($K_{\text{сб}}$). It is calculated by the formula:

$$K_{\text{сб}} = \frac{M_{\text{п}} \cdot N_{\text{п}}}{O_{\text{п}}}, \quad (15)$$

where $O_{\text{п}}$ is the planned annual volume of construction and installation work to be performed by the organization's own personnel, in thousands of rubles; $N_{\text{п}}$ is the planned coefficient of use of average annual production capacity.

The condition of balance occurs when the value of the coefficient $K_{\text{сб}} = 1$.

3.10. The planned coefficient of use of production capacity ($N_{\text{п}}$) is calculated beginning from the planned levels of use of the organization's principal machine and labor resources according to the formula:

$$N_{\text{п}} = \frac{1}{\frac{m}{K_{\text{MT}}} + \frac{1-m}{K_{\text{r}}}}, \quad (16)$$

where K_{MT} is the planned coefficient of use of the machinery sources of the construction organization; K_{TW} is the planned coefficient of use of the organization's labor resources.

3.11. The use of the principal machine and labor resources is planned on the basis of an analysis of the level attained in the base year taking into account increases during the planning period owing to:

- a. improvement in the organization of labor, production, and management;
- b. elimination of unproductive expenditures and "tight spots" in production;
- c. improvement of material-technical supply to construction and raising the level of production staffing and available equipment.

3.12. The planned coefficients of the use of the construction organization's labor and machine resources are reviewed and ratified by the higher-ranking organization.

3.13. Failure to comply with the balance of production capacity for the planning year testifies to the need: to refine calculations of the need for machine and labor resources; to assign them specially from other organizations; to raise their productivity; and, to improve their work regimes.

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CSO: 1821/008

CONSTRUCTION

CONSTRUCTION IN NON-CHERNOZEM REGION

Moscow SEL'SKOYE STROITEL'STVO in Russian No 8, Aug 81 (signed to press 13 Jul 81)
pp 1-2

[Article: "New Horizons for the Nonchernozem Zone"]

[Text] Questions of further developing agriculture in the Nonchernozem Zone of Russia and, on that basis, of developing the culture and everyday life of the settlements and villages of that zone occupied an important place in the resolutions of our party's 26th Congress. The decree adopted by the CPSU Central Committee and USSR Council of Ministers "On Further Developing and Improving the Effectiveness of Agriculture in the RSFSR Nonchernozem Zone in 1981-1985" significantly broadens the horizons of the Nonchernozem Zone and creates conditions for successfully developing agriculture and rebuilding rural population centers.

In carrying out the party and government Nonchernozem Zone decree previously adopted in 1974, agricultural workers, in cooperation with rural construction workers and designers and under the leadership of the party organizations of the zone's autonomous republics and oblasts, have achieved quite a few successes. The capital investments allocated for the Nonchernozem Zone permitted a significant increase in the fixed production assets of sovkhozes and kolkhozes and an increase in the energy capacity of agriculture. The use of mineral fertilizers increased by more than 30 percent. Sown area expanded. Some 1.3 million hectares of irrigated and drained land was transferred to zone farms and amelioration work was done on 1.9 million hectares.

A total of about 23 million square meters of housing, general educational schools with nearly 500,000 seats, preschool institutions with places for 178,000, 15,000 hospital beds and clubs and palaces of culture with places for 175,000 have been put up on kolkhozes and sovkhozes of the Nonchernozem Zone. Very important work was done on building hard-surface roads, about 30,000 km of them, primarily by road-building organizations of the Roskolkhozstroyob'yedineniye. Many new stockraising projects, complexes and farms were built. All these ensured a perceptible upsurge in the production of agricultural products in the RSFSR Nonchernozem Zone.

Speaking at the November (1979) CPSU Central Committee Plenum, Comrade L. I. Brezhnev said that, in order to systematically improve the well-being of the people, "we need to actualize party policy in improving efficiency and quality with double and triple the energy. There are no alternatives to this policy."

At the same time, the new Nonchernozem Zone decree notes that local agricultural and soviet agencies are still paying insufficient attention to solving the most important questions of economic and social development in this zone.

The capital investments set for the Nonchernozem Zone, especially those for putting capacities into operation, have been incompletely used. The production of farming and stockraising output is still not being ensured in full volume and the opportunities of industrial cooperation and improving land use effectiveness are not being fully actualized.

At the same time, the decree points out that party, soviet, agricultural and water management organizations of autonomous republics and oblasts of the RSFSR Nonchernozem Zone are obligated, based on continued intensification of agricultural production, extensive land reclamation, comprehensive mechanization, chemization, concentration and interfarm cooperation, and introducing the achievements of science, engineering and leading experience, to ensure an increase of 30 percent in gross agricultural output on zone kolkhozes and sovkhozes in 1985 as compared with the level achieved in the 10th Five-Year Plan.

It is known that capital investments in the country's national economy are constantly growing, which applies to the RSFSR Nonchernozem Zone as well. The CPSU Central Committee and USSR Council of Ministers set an overall capital investment volume for zone agriculture totalling 39.3 billion rubles in 1981-1985, considerably more than in the preceding five-year plan. It is the task of rural construction workers and planners to solve in a business-like manner the problem of obtaining a maximum return on each ruble of capital investment. It is foremost important to accelerate and unconditionally ensure the start-up of production capacities, housing, cultural and personal-services facilities on each kolkhoz and sovkhoz and to reduce unfinished construction, which has grown inordinately, and ensure strict observance of work schedules.

Heretofore, we sometimes did not succeed in this, because the primary links of construction production were not always closely interlinked. In a number of instances, assignments were set construction workers without consideration of their opportunities and were often reviewed in the course of the year.

The new decree on the Nonchernozem Zone sets a firm assignment for USSR construction ministries and departments for the 11th Five-Year Plan as a whole in terms of tractor work in building production, cultural and personal-services facilities and housing for agricultural and water management enterprises and organizations.

In order to ensure the development of Nonchernozem Zone agriculture in the current five-year plan, we are faced with building many repair shops, facilities for storing agricultural equipment and modern, mechanized warehouses for mineral fertilizers, inasmuch as the zone will receive 390,000 tractors, 104,000 tons of grain harvester combines and 20,500 excavators, 20,400 bulldozers, 4,300 scrapers and much other modern agricultural equipment during this period, and mineral fertilizer deliveries will be increased to 6.68 million tons.

In the current five-year period, the CPSU Central Committee and USSR Council of Ministers have set an assignment on building and putting into operation Nonchernozem Zone stockraising complexes and mechanized farms to produce milk, raise and fatten young beef, raise and fatten hogs, egg- and broiler-specialized poultry farms, mechanized storage facilities for fertilizers, lime and other chemicals, hothouses, vegetable and potato storage facilities, silage and haylage and forage grain storage facilities.

This same decree approves a large program for developing rural housing, cultural and personal-services construction. Some 9.9 billion rubles is being allocated for this purpose in 1981-1985.

It is anticipated that soviet and agricultural agencies of autonomous republics and oblasts of the RSFSR Nonchernozem Zone and USSR ministries and departments doing construction in this zone will put into operation in the 11th Five-Year Plan 33.5 million square meters of housing, preschool institutions with places for 230,000, clubs and palaces of culture with places for 272,000 and central rayon hospitals with 19,300 beds on kolkhozes, sovkhoses and other agricultural and water management organizations and enterprises. Improvement in the provision of these facilities with utilities is anticipated.

Road construction will receive accelerated development. More than 38,000 km of hard-surface roads must be built and put into operation during the five-year plan.

Such unconditional implementation of rural construction plans this ambitious in the RSFSR Nonchernozem Zone necessitates even wider development of socialist competition among rural construction workers, thorough study of the leading experience achieved at many rural construction projects and their introduction into production everywhere. For example, experience in building Nekrasovskiy Poultry Farm in Khabarovskiy Kray is instructive. Subdivisions of the USSR Ministry of Construction of Heavy Industry Enterprises, which built this poultry farm, concluded a "workers' relay" agreement with other construction participants and achieved smooth work among all links: the client service, planners and suppliers of equipment and materials. As a result, the poultry farm complex was put into operation three years ahead of schedule.

The initiative of the Ivanovskaya obkom, which organized sponsorship assistance to industrial enterprises and accelerated construction of stockraising complexes and farms, has provided good results. Construction of the country's largest poultry farm, the "Lesnaya," with a capacity of 10,000 tons of duck meat per year, is a shining example, as the farm was put up twice as fast as established by the norms, using the people's construction site method.

As was noted at the all-union seminar held apropos of this in Ivanovo, such experience is valuable for its comprehensive approach -- the systematic, purposeful implementation of interrelated measures on improving the planning, financing and organization of flow-line construction using industrial, lightweight components and enlisting enterprise workers in the construction without damage to their main activity and introducing the brigade contract.

Rostov workers have demonstrated good experience and initiative in construction. L. I. Brezhnev has warmly congratulated them for their remarkable labor achievements, giving high praise to work experience under the slogan "Build and Utilize Ahead of Schedule."

The patriotic movement of Don workers, which is aimed at obtaining high end results in the area of capital construction, must receive a broad response among Nonchernozem Zone rural construction workers and ensure successful fulfillment of the resolutions of the 26th CPSU Congress and the assignments of the 11th Five-Year Plan.

The Basic Directions for developing our state which were adopted by the 26th CPSU Congress state: "Improve the quality of lay-out, architecture and construction

resolutions and reduce construction costs." This applies wholly and fully to the construction of rural population centers of the Nonchernozem Zone.

In light of this, it should be noted that industrializing such Nonchernozem Zone construction in every way possible is a very important problem on whose solution the rates and quality of housing, cultural and personal-services construction will depend.

The task at hand demands that both the urban house-building enterprises of the union ministries and rural house-building combines which have been created in recent years be used at full capacity. Interkolkhoz construction organizations can be of considerable help in industrializing rural housing construction. At the end of this past year, more than 40 percent of the houses put up in the Roskolkhozstroyob'yedineniye were fully prefabricated.

The CPSU Central Committee and USSR Council of Ministers Decree "On Further Developing Factory Production of Wood Panel Houses and Sets of Wood Components for Houses Using Local Materials for Rural Housing Construction" has become a landmark in this important work. Some 127 such enterprises and shops which are directing their output into construction in the Nonchernozem Zone have been created just in the USSR Ministry of Timber and Wood Processing Industry.

The party and government have recognized the expediency of organizing the construction and expansion of industrial enterprises in the Nonchernozem Zone in the 11th Five-Year Plan for the purpose of shifting the production capacities of contractor construction organizations to building cultural and personal-services projects and housing, as well as agricultural production buildings.

One important factor ensuring continued provision of Nonchernozem Zone settlements and villages with amenities, as well as developing the culture and everyday life of rural workers, is the CPSU Central Committee and USSR Council of Ministers decree instructing the USSR Ministry of Gas Industry, jointly with the RSFSR Council of Ministers and the Ministry of Construction of Enterprises of Petroleum and Gas Industry, to make a list of gas pipelines for distribution stations needed to provide the kolkhozes and sovkhozes of this zone with gas in 1981-1985. The RSFSR Council of Ministers has been granted the right to permit zone farms not supplied with gas to use electric heaters to provide heat to production facilities, beginning in 1982, with a total installed capacity of up to 400 kW per population center. In this same decree, the RSFSR Council of Ministers, jointly with the USSR Ministry of Agriculture and USSR Ministry of Rural Construction, is to approve a 1981-1985 plan for building a couple of experimental demonstration settlements in each autonomous republic and oblast of this zone.

The CPSU Central Committee and USSR Council of Ministers have approved a Komsomol Central Committee initiative on sending student detachments to build national economic projects in the RSFSR Nonchernozem Zone -- primarily housing, cultural and personal-services buildings and rural roads.

Other important steps have also been taken which will ensure continued development of the rural economy and improvement in the culture and everyday life of laborers of the Nonchernozem Zone.

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CONSTRUCTION

RURAL CONSTRUCTION IN SMOLENSKAYA OBLAST

Moscow SEL'SKOYE STROITEL'STVO in Russian No 8, Aug 81 (signed to press 13 Jul 81)
pp 3-6

[Article by B. Katyukha, deputy chairman of the Smolenskaya Oblast ispolkom: "Non-chernozem Zone of Russia -- Our Common Concern"]

[Text] Soviet people and our friends abroad have accepted the accountability report by the party Central Committee General Secretary, Comrade L. I. Brezhnev, and the "Basic Directions of USSR Economic and Social Development for 1981-1985 and to 1990" with tremendous satisfaction and enthusiasm. In reading these historical documents, one can vividly see the heights our country will reach in the 11th Five-Year Plan and the decade as a whole.

The success of the food program, as an integral part of the current five-year plan, will depend on how completely the plans for developing agriculture are carried out, on how intelligently and efficiently we will be able to use the capital investments and material-technical resources being directed into this branch.

The struggle to carry out party and government decisions on developing the Nonchernozem Zone of Russia has become a truly vital matter for the entire Soviet people. Party and economic agencies are doing a great deal of creative work on developing agricultural production, strengthening its material-technical base and improving the housing and socioeconomic living conditions of rural workers.

Take Smolenskaya Oblast, for example. Here, rural construction workers are reaching new frontiers year in and year out. During the 10th Five-Year Plan alone, they did contracting work worth 735 million rubles, 1.5-fold more than in the preceding five-year period. Some 450,000 square meters of housing has been put up in rural areas, enabling us to improve the housing of 9,000 families. Public housing is being built on a qualitatively new basis: with central heating, water supply and sewers. The entire housing supply for kolkhozes and sovkhoses has been provided with electricity and 87 percent of it has gas.

Schools with places for 20,000 students, preschool institutions with places for 3,850, 205 stores, 78 dining halls and many other social and personal-services buildings have been built during the five-year period.

Road construction occupies a special place in raising the standards of living and culture of rural laborers. In recent years, the tempo of road construction has risen

and the technical level and quality of the installations have been improved. The base of road-building organizations has been strengthened: the oblast has 38 asphalt plants and the equipment fleet has grown. In Vyazemskiy, Shumyachskiy and Pochinkovskiy rayons, road-builders, jointly with local soviets, are coordinating the actions of enterprises and contractor organizations. All the central farmsteads of kolkhozes and sovkhoses of many rayons are now linked to the rayon centers with hard-surface roads.

I should especially like to note the selfless work of the Roslavl'skiy DPMK [mobile mechanized road-building combine] and its best production workers -- fitters brigade leader M. D. Rybakov, driver B. V. Vasin, grader operator A. K. Tarasov and excavator operator T. Ya. Doron'kin.

The production base of rural construction organizations has been strengthened considerably. Just in recent years, new capacities have been put into operation to produce prefabricated reinforced concrete at Vyazemskiy Reinforced Concrete Products Plant and the Demidovskiy keramzite gravel shop, with a capacity of 100,000 cubic meters per year, was built. Construction of support bases for rural contractor organizations is basically complete. The following new trusts were created -- "Mostospetsstroy," "Smolensksel'khoztekhstroy," "Vyaz'masel'stroy" and Smolensk SSK [rural construction combine].

There is probably no collective in which these words of the party, recorded in the "Basic Directions of USSR Economic and Social Development for 1981-1985 and to 1990," have not found a warm response: "Continue carrying out the comprehensive program of transforming the RSFSR Nonchernozem Zone into a region of highly productive farming and stockraising and developing the branches of industry related to them. Build housing, roads and sociocultural, municipal- and personal-services projects at outstripping rates."

In accordance with this CPSU Central Committee and USSR Council of Ministers provision, a decree was adopted in April of this year "On Further Developing and Improving the Effectiveness of Agriculture of the RSFSR Nonchernozem Zone in 1981-1985."

The oblast party organization and local Soviets of People's Deputies are doing much to actualize this grand work program, so near and understandable to the people. They are helping the collectives of construction organizations and industrial enterprises accelerate scientific and technical progress, increase commodity output through labor productivity growth or even with a decrease in staffs, and develop competition under the slogan "More Output With Smaller Staffs."

It is gratifying to note that representatives of various branches of the national economy are participating in implementing the program for transforming the Nonchernozem Zone which has been outlined by the party and government. Valuable experience has been accumulated in the oblast in installing facilities through the efforts of construction workers and industrial enterprises. One example of such sponsorship assistance would be installation of Diyeven'skiy Poultry Farm and "Kozinskiy" Hot-house Combine.

The oblast student detachment imeni Yu. A. Gagarin, the largest construction detachment in the RSFSR Nonchernozem Zone, has made a weighty contribution to upgrading villages of the Smolensk area, doing contracting work worth 179 million rubles over the past five years.

In a word, the movement to "Live in the Smolensk Area and Be A Builder" has become a truly mass movement among oblast workers. And there is enough work for all.

The Soviets of People's Deputies play a significant role in reconstructing villages. For example, the work of soviets of Gagarinskiy Rayon deserves a positive evaluation. Here, construction is done following a long-range plan; it is constantly monitored by the ispolkoms of the rayon and village soviets. As a result, a total of 28,000 square meters of housing, schools, kindergartens and clubs was put into operation on sovkhoses and kolkhozes during the five-year period. A majority of the farms are well provided with amenities and have received an expressive architectural appearance.

Lay-out and development plans have been worked out for all rural rayons and all kolhoz and sovkhos central farmsteads. They are now being adjusted. This work will be completed next year. At present, top-priority lay-out and development plans are being implemented for 160 central farmsteads, 43 of which are being built up comprehensively. One example would be Nikol'skoye village, the central farmstead of the Order of Lenin Kolkhoz imeni Radishchev in Gagarinskiy Rayon. A full complex of cultural and personal-services projects has been put up here -- palace of culture, department store, dining hall, hotel, kindergarten. Intensive housing construction is underway. All buildings are connected by well-built streets and squares and are connected to the central heating, water and sewer systems.

As life and practice have shown on many kolkhozes and sovkhoses, solving the problems of comprehensive development invariably helps provide farms with stable, skilled personnel. The concern for people and for the future of the village has become a characteristic feature of the activity of oblast local soviets and the oblast party organization.

Considerable construction is done here by the direct labor method. Over the past five years, sovkhoses and kolkhozes have utilized 216 million rubles, or a third of all capital construction in rural areas, through their own efforts. For example, "Rassvet" pedigreed stock farm in Novoduginskiy Rayon is being successfully developed, with a great deal of well-done, comprehensive construction and up to half a million rubles being utilized annually. On "XX parts"yezd" Kolkhoz in Roslavl'skiy Rayon, 27 housing units, a trade center, baths and a kindergarten were put up by the direct labor method in the 10th Five-Year Plan. There are many such examples and they testify convincingly that the direct labor method is a large, important reserve for accelerating rural construction.

Therefore, the party organization and oblispolkom are constantly helping sovkhoses and kolkhozes which use the direct labor method. This year, for example, the oblast timber management administration, "Obkolkhosles" association and timber processing enterprises will supply rural areas with 610 two-apartment wood houses, dozens of cribs and 5,500 cubic meters of logs.

Individual housing construction has received extensive development. Over the last five-year period, a total of nearly 96,000 square meters of housing was built in the oblast through the means of sovkhos workers and kolkhoz members. But there is also abnormality in this important work. Individual builders experience difficulties in acquiring finished houses, parts for them, electrical and plumbing equipment and finishing materials. Rural house-building cooperatives have not been organized.

These shortcomings are now being eliminated. Soviet and economic agencies are assisting individual construction and are providing builders with materials as they are able and offering them a broad selection of plans. The kolkhozes and sovkhoses, in turn, are rendering individual builders comprehensive assistance in acquiring transport and manpower.

The highest goal of party economic strategy is unswerving growth in the material and cultural standard of living of the Soviet people. Comrade L. I. Brezhnev, CPSU Central Committee General Secretary, pointed out at the 26th Party Congress that the creation of stable labor collectives and effective use of the production potential accumulated in the countryside cannot be achieved without rebuilding and renewing rural areas and providing them with public amenities. The task set is to build well-equipped houses with economic services, children's preschool institutions and clubs at accelerated rates in rural areas.

Our oblast is being allocated more than 1.5 billion rubles in the five-year period for these purposes, including 800 million rubles for construction-installation work. During this period, upwards of one million square meters of well-built housing must be built on sovkhoses and kolkhozes. In 1981-1982, each farm must put up at least 10 apartments each year, and in subsequent years -- 15 apartments.

We are faced with erecting rural preschool institutions to seat 5,485, schools for 7,328 pupils, clubs with places for 12,800, dining halls with places for 1,590 and 38 trade centers and stores, as well as with putting 2,000 km of roads into operation and doing major overhaul work on nearly as much road.

The 11th Five-Year Plan assignments for developing agriculture in the Smolensk area are huge, and they must all be met on schedule, without mistakes, without excessive expenditures of labor or funds, and with good quality. These questions have been examined at a session of the oblast Soviet of People's Deputies. Consideration was given to and plans were made for promptly concentrating the primary forces and where to focus attention in order to significantly raise the level and effectiveness of organizational work.

We plan to resolve the tasks set for reconstructing rural areas by improving the operation of existing rural construction combines and creating new and more powerful ones to produce complete sets of lightweight industrial components with a high degree of factory readiness. This is now the general line in rural construction.

In our oblast, there are already three SSK's, in Vyaz'ma, Safonovo and Izdeshkovo, which can produce a total of 150,000 square meters of series-35 large-panel houses per year, including 20,000 square meters of "arbolite" housing. However, these enterprises have not fully mastered their capacities yet. They are faced with overcoming many difficulties in order for SSK's to provide oblast rural laborers with 75,000 square meters of series-35 large-panel housing this year.

In the next couple of years, we anticipate bringing unfinished construction down to the normative and preventing the extension of contractor work schedules. Sponsorship assistance on the part of industrial enterprises of the oblast's cities will be intensified. Broad strata of the population will be enlisted in providing villages with public amenities.

The resolution of a number of rural construction problems is sometimes beyond the strength of a single sovkhoz or kolkhoz. In such instances, the rayispolkoms will use appropriate variants of means consolidation. The personal services administration, oblast potreboyuz and other departments will not undertake the uncoordinated construction of trade, personal-services or public-catering facilities, but will shift to their comprehensive installation.

Rural construction is helped well by the active influence of the local soviets, economic leaders, trade union and Komsomol organizations on all aspects of socialist competition, which has in fact developed widely in the oblast, including among rural construction workers. Collectives of the Smolensk SSK, the Gagarinskiy, Yartsevskiy, Shumyachskiy and Velizhskiy MPMK [probably: mobile mechanized bridge-building column], Vyazemskiy, Roslavl'skiy and Dukhovshchinskiy DRSU [house repair and construction administration] and Demidovskiy, Velizhskiy and Vyazemskiy mechanized columns of "Smolenskobl'sel'stroy" administration, in response to the party and government decree on further developing the Nonchernozem Zone, have adopted obligations to cope with the work program for this year and the five-year plan as a whole ahead of schedule.

Many leading production workers have supported the call by Moscow and Leningrad workers and have obligated themselves to complete personal and brigade assignments for the first year of the current five-year plan by 7 November, that is, they have resolved to outstrip the five-year plan calendar by 55 days. On an oblast scale, this means additional work on schools and clubs and hundreds of new apartments.

But it must be noted that oblast rural construction work does have blunders. The erection of production facilities has not always been done as part of a complex that includes housing, cultural and personal-services facilities. The installation of rural utilities remains a bottleneck. In a number of construction organizations, work quality remains at a low level and the proportion of unfinished construction is not being reduced.

These shortcomings result from the fact that the leaders and specialists of construction sites and industrial enterprises are still slow to master modern production leadership methods, display little initiative and do not always focus the efforts of labor collectives skillfully on basic, long-range tasks and problems.

Under these conditions, the local soviets constantly and thoroughly analyze the causes of lag in certain collectives and mobilize builders to use reserves skillfully. We need to continue achieving fundamental improvement in rural construction, to raise the level of leadership of this branch, constantly strengthen discipline and personal responsibility, and coordinate and supervise more actively the work of construction organizations and industrial enterprises of the rural construction industry.

It must not be forgotten that the plan is law and its fulfillment is not just a question of honor for each worker, but is also a question of observing state discipline. Whoever permits nonfulfillment of plans and assignments must be personally responsible for that to the party and the country.

Each rural builder must now strive to apply all his effort and skill to successfully implementing the resolutions of the 26th CPSU Congress, to occupy a worthy place in the ranks of struggle to transform the Nonchernozem Zone of the Russian Federation.

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CONSTRUCTION

ORLOVSKAYA OBLAST INTERKOLKHOZ CONSTRUCTION ASSOCIATION

Moscow SEL'SKOYE STRCITEL'STVO in Russian No 8, Aug 81 (signed to press 13 Jul 81)
pp 11-12

[Article by V. Zaozerskiy, chief engineer at Orlovskaya Oblast Interkolkhoz Construction Association, and E. Gaun, association department head: "Improving the Construction Conveyor"]

[Text] Comrade L. I. Brezhnev noted in the Accountability Report to the 26th CPSU Congress that the 11th Five-Year Plan will be a serious test for construction workers. One characteristic feature of it is the concentration of forces in every way possible on the fastest possible completion and start-up of those enterprises capable of ensuring the greatest increment in output and the opening up of bottlenecks. In light of these tasks, one of the central positions must be occupied by the system of continuous planning and flow-line construction in rural areas.

In our association, such a system has been in use for four years now. Its essence is the creation of a service consisting of a single client, a single general contractor and a single general planner and, on that basis, a planning-design-construction conveyor system which provides an opportunity for uninterrupted construction and installation from the plan to the finished construction product.

What have we done to set the system of continuous planning in motion at rural construction projects.

Foremost, capital investments have been concentrated in the hands of a single client.

Whereas in 1977 we concluded 262 agreements with various clients, each with an average work volume of 114,000 rubles, in 1978 we had 35 clients, in 1979 -- 26 and in 1980 -- 24. The number of projects being built simultaneously was reduced nearly two-fold.

The provision of kolkhoz construction projects with estimate-planning documentation has been centralized through a single client, the kolkhoz UKS [capital construction administration]. It then becomes possible to conduct a unified technical policy, to put initial data gathering into proper order, and to increase the responsibility of designers for work quality. Now, only such UKS's order documentation here.

The UKS is granted the right to draw up a capital construction plan and coordinate it with contractor construction organizations. We first did this work in drawing up the 1979 plan.

As a result of long searching and with the help of workers in the oblast Gosbank office, a construction financing variant was found which did not infringe on the rights of the developer-farm. Kolkhoz boards have given rayon OKS's [capital construction departments] the official right to transfer capital investments from their own accounts for work done by designers and contractors. As a result, additional current accounts no longer need to be opened for the OKS in the rayon and new staff positions are no longer required in the rayon Gosbank division or with the client to handle such accounts.

In 1979, we had agreements only with rayon OKS's, and were drawing up additional agreements with kolkhozes on special terms, so a total of only 26 agreements were drawn up.

Much work has been done to strengthen the production-technical construction base, which was practically nonexistent in the Orlov association. Thanks to this, whereas 70 percent of the demand for prefabricated reinforced concrete was met through other organizations and oblasts in 1976, that figure was only 10 percent in 1980. The start-up of the Orlov Reinforced Concrete Products Plant and the Livenskiy Reinforced Products Combine solved the problem of producing prefabricated reinforced concrete for the growing work volume.

In 1980, we finished building a mechanization base with a maintenance shop and began building a wood panel house-building combine to produce 70,000 square meters of housing per year; this year, a motor pool with 250 vehicles will begin operating, we are planning and will build a tripolite gravel shop and rayon interkolkhoz construction organization bases, and the timber management enterprise is being renovated.

Steps are being taken to accelerate housing construction in order to improve the housing and personal-services conditions for association workers and to attract additional workers. During 1978-1980 alone, some 47,500 square meters of housing was put into operation, while only 41,400 square meters was put into operation in the entire Ninth Five-Year Plan.

The association is doing a great deal of work on accelerating the construction of agricultural projects by raising the technical level of construction production, using industrial components and converting construction sites into assembly yards, using fully prefabricated elements. Increasing the volume of fully-prefabricated construction, which has increased four-fold since 1976 and will reach 70 percent by the end of the 11th Five-Year Plan, is of top-priority importance.

Frame buildings with spans of 18 and 21 meters, keramzite-concrete enclosures, PR and SPR lightweight corrugated sheet roofing and roofs made of structural roofing shingles with efficient heaters are in widespread use. We are now increasing the introduction into production of fully-prefabricated semi-frame buildings designed by the TsNIIEPsel'stroy, welded foundations, prefabricated keramzite-concrete floors, troughs, manure discharge channels and other items.

With a view towards further accelerating agricultural construction, "Orelkolkhoz-proyekt" Institute has worked out a comprehensive industrialization program for 1981-1985. Standard plans have been selected for agricultural buildings with the best technical-economic indicators and have been accepted for introduction. Implementation of this program will permit improvement in the use of plant capacities, a 25.9 percent reduction in the labor intensiveness of construction and raising the level

of full prefabrication to 79.2 percent. Using standard designs as a base, the institute has worked out farmstead-type house designs with an improved lay-out which meets modern requirements.

In housing construction, we have organized the release of series-25 houses with 8, 12 and 27 apartments, and beginning in 1980 -- one- and two-apartment farmstead-type houses. Last year, the association created a shop to produce farmstead-type houses using fully factory-finished modular units, including plumbing, wiring and roofing. Three such experimental houses have been built in Luzhna settlement.

Labor organization and worker wages have been improved. Some 61 percent are now covered by the contract-bonus system (80 percent in the leading organizations) and 60 of 137 brigades are working under the brigade contract method.

The association has created a rural construction combine which is manufacturing and installing complete sets of fully prefabricated series-25 houses, doing below-grade work and also installing the above-grade portion.

The association has an organization specialized for finishing work, mechanization and motor transport and has organized a mobile mechanized column for doing plumbing work and installing utilities on a subcontractor basis, as well as an electric wiring SPMK [mobile mechanized construction column].

These changes in organizational structure have helped set up flow-line work at construction sites.

To prepare technological documentation, the association has a department for the continuous planning and engineering preparation of construction production. Its workers draw up directive, calendar and network schedules for two years of construction and, on their basis, schedules for flow movement, lists of complete sets of components and materials to be manufactured and delivered, and it works out work production plans, technological charts and other documentation necessary for organizing work at construction sites and industrial enterprises and participates in drawing up intra-construction site titles lists of work volume by project.

With a view towards interesting workers in the better use of machinery and vehicles, temporary provisions have been developed and introduced on including machine operators in installation brigades and on bonuses to drivers for hauling complete sets of components to projects.

In developing these schedules, plant shops are set their own monthly schedule plans broken down by day, shift and brigade, for the products list, as well as schedules for shipping components by motor transport and rail. The schedules are monitored by the association's chief dispatcher, and in the rural construction combine, by the combine dispatcher.

A weekly-daily planning-management system is used for operational supervision and management of construction flows. With a view towards the fuller and more successful operation of this system, the flows this year have been provided with shortwave dispatcher communications.

"Oblkolkhozstroy" association operation using the continuous planning and flow-line construction system for three years permits establishing its effectiveness, which is evident right away along three lines.

First of all, the impact results from the smoother start-up of facilities. Labor productivity and work quality indicators have improved.

In 1980, all the housing, social, cultural and personal-services projects were evaluated "good."

Work using the continuous planning system and the implementation of measures associated with it enabled us to achieve certain successes in meeting technical-economic indicators even back in 1979: the plan was fulfilled in terms of labor productivity and putting facilities into operation and one million rubles in profit was obtained.

Constant party and economic agency supervision of the implementation of directive schedules ensured a reduction in unfinished construction.

Introduction of flow-line work methods in the installation of frame agricultural buildings and the creation of flow-line brigades made it possible for the association to eliminate its lag in installing these buildings within two years and to achieve the desired start-up smoothness (a majority of these buildings were released by the stalling period).

However, along with the positive results achieved in the course of continuous planning and flow-line construction, a number of factors hampering the normal, smooth operation of construction organizations on directive schedules and meeting the schedules themselves are revealed.

This past year, 1980, was characteristic in this regard. The association fulfilled the plan in terms of putting production projects and housing into operation and in terms of finished construction output.

Compared with the annual plan, the association apparently operated rather well, but qualitatively, the start-up of projects looked like this: smoothness coefficient -- 0.426, including five percent released in the first quarter, 16.3 percent in the second, 25.9 percent in the third and 52.8 percent in the fourth. Of the 73 projects anticipated by the directive schedules, 34 were released, and only 22 within the time periods established by the schedules.

Why?

First of all, because two-year construction planning has not yet been introduced in practice. Local initiative in continuous capital investment planning is not yet legalized, so only the plan for the next year is worked out in detail, while the second year is planned very conditionally.

Thus, in working out 1979-1980 directive schedules, 25,800 square meters of housing totalling 9.6 million rubles and production facilities totalling 8.4 million rubles were planned for last year. When the 1980 plan was refined on 15 February, it had undergone significant changes: included in it were an additional 45 feed shops, 128 silage and haylage trenches, and the allocations for their construction were taken from projects anticipated in a previously approved plan and directive schedules. As a result, the following picture emerged: with 13,300 square meters of large-panel housing scheduled to be put into operation, 1.8 of the 6.4 million rubles needed was allocated, and for stockraising premises -- 6.4 of the 8.4 million rubles needed.

In other words, the directive schedules had just become unrealistic, and projects outlined in the adjusted plan were built and put into operation instead of scheduled projects.

In view of the mistakes of 1980, our association, jointly with the oblast agriculture administration, worked out and jointly coordinated its directive schedules this year and then distributed capital investment limits for them. Leaders and specialists of lower general contractor organizations, clients, "Orelkolkhozproyekt" Institute, kolkhoz capital construction departments, rayon ispolkoms and OKS's were enlisted in the development of those schedules.

The 1981 plans and schedules anticipate the release of 26,905 square meters of housing, a club with places for 200, a kindergarten for 50 children, five seed-cleaning complexes and 15 stockraising premises with places for 6,680 head; in 1982 -- 37,063 square meters of housing, a club with places for 300, a kindergarten for 50 children, three seed-cleaning complexes and 17 stockraising premises with places for 6,970 head.

In housing construction, we anticipate encompassing the largest number of kolkhozes possible and changing over to the construction of farmstead-type houses. The 1981 plan is to build 97 such houses, or 28.4 percent of the total housing space being put into operation, and in 1982 -- 232 houses, or 43.7 percent of the total.

Beginning in January 1981, a rural construction combine with an annual work program of five million rubles has been in operation in Livna. This SSK is entrusted with the construction of series-25 houses, sociocultural and personal-services facilities and industrial agricultural buildings on a general contractor basis in Livenskiy Rayon, as well as with installing large-panel buildings in neighboring Pokrovskiy, Verkhovskiy, Dolzhanskiy, Kolpnyanskiy and Novodereven'kovskiy rayons.

The combine will build these series-25 buildings on a flow-line basis, which will subsequently become cost-accounting construction. The structure of the flows is determined calculating on carrying out the full volume of housing installation and finishing work, as well as construction of auxiliary buildings, boiler rooms, treatment plants, utility lines, and so forth.

At the same time, this work is frequently held up by an absence of specialized motor transport and the inadequate use of machinery. The material-technical supply system requires considerable improvement.

Questions of utilities and operating treatment plants and road construction have not been resolved.

Our subcontractor organizations have still not been "hooked into" the continuous planning system, operating personnel training for new rural projects has not been set up properly, and a number of other problems are also unsolved.

We are resolving in practice questions of planning and staffing projects and installing equipment. The value of this system lies in its comprehensive nature, in which planning, design, supply and organization of construction production are interlinked to attain the final goal of creating finished construction output and ensuring its smooth start-up.

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CSO: 1821/006

CONSTRUCTION

STEPS TAKEN TO PUT KHAR'KOV ELEVATOR CONSTRUCTION BACK ON SCHEDULE

Moscow EKONOMICHESKAYA GAZETA in Russian No 37, Sep 81 p 19

[Letter by S. Lutsenko, secretary of the Khar'kovskaya Oblast Committee of the CPSU in response to the newspaper report "They Started Late," published in No 25 of EKONOMICHESKAYA GAZETA]

[Text] The cases of violation of the delivery schedule for reinforced concrete for the elevator under construction at Belyy Kolodez' station, which were spoken of in the report, did in fact occur.

At the present time the buildings of the elevator have been assembled and work at the sites involves machine installation, electrical installation, and construction of the energy systems. A meeting of the headquarters was held at the site in July of this year, with participation by the Ukrainian SSR deputy ministers of rural construction and procurements and all the managers of the construction and installation organizations. They developed and ratified steps to insure that the elevator is put into operation on time.

At the present time the client has generally resolved all problems of delivery of equipment and cable-wire articles. The construction site has a full complement of workers and the essential work and living conditions have been established. The oblast party committee has organized itself to constantly monitor progress on construction of the elevator.

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CSO: 1821/008

CONSTRUCTION

PREPARATIONS FOR CHANGING TO NEW BUDGET-ESTIMATING NORMS, PRICES START

Moscow *EKONOMIKA STROITEL'STVA* in Russian No 7, Jul 81 (signed to press 30 Jun 81)
pp 76-78

[Article: "About the Conversion to New Budget-Estimating Norms and Prices for Construction"]

[Text] With a view to providing for the timely conversion on 1 January 1984 to the new budget-estimating norms and prices for planning capital construction and for determining the budget-estimated cost of construction projects, the USSR Council of Ministers, by decree of 4 January 1981, defined the procedure for reviewing existing budget-estimating and standards documents for construction and for developing new ones, for preparing the necessary standard-practices instructions, and for recomputing consolidated and facility budget estimates in accordance with the new budget-estimating norms and prices, and it established specific deadlines for carrying out these operations and designated the persons who are to carry them out.

In particular, USSR Gosstroy is charged:

with completing, in the first quarter of 1982, with the participation of USSR ministries and agencies, the development and approval of new budget-estimating norms for construction operations;

with developing, with the participation of USSR ministries and agencies and Union-republic councils of ministers, prior to 1 March 1982, a collection of average regional budget-estimating prices for imported building materials, articles and structure and a price schedule for machine hours for construction machinery; prior to 1 July 1981--a collection of budget-estimated prices for hauling freight for construction; and prior to 1 July 1982--a collection of unified regional individual cost sheets for construction work and a collection of budget-estimating norms (or cost sheets) for installing equipment;

with developing, with the participation of USSR Gosplan, USSR Minfin [Ministry of Finance], USSR Stroybank and USSR TsSU [Central Statistical Administration], and approving prior to 1 March 1981, instructions on a simplified procedure for recomputing the budget-estimated cost of construction and installing work and other work and expenditures by branch of the national economy, by branch of industry and by sector within the branch of industry for construction projects carried over into

1984, and the budget-estimated cost of construction and installing work and other work and expenditures for construction projects newly started in 1984;*

with establishing, prior to 1 August 1981, tasks for ministries and agencies for the development of indices of change in the budget-estimated cost of construction and installing operations and other operations for identical types of construction by branch of the national economy, by branch of industry and by sector within the branch of industry, as well as examining drafts of the indicated indices that are presented by USSR ministries and departments and Union-republic councils of ministers and with approving them prior to 1 March 1983;

with presenting to the USSR Council of Ministers in the first quarter of 1982 preliminary data about the contemplated magnitude of change of the budget-estimated cost of construction work that is caused by the introduction of the new budget-estimating norms in comparison with existing budget-estimating norms, in comparable prices for comparable operations;

with developing in a 2-month period, with the participation of the construction ministries, USSR Stroybank, USSR Gosbank and USSR Goskomtsen [State Committee for Prices], and with approving instructions about the procedure for determining the initial data about the terms and distances for hauling local and imported building materials, articles and structure and instructions about the procedure for developing new budget-estimating prices for building materials, articles and structure;#

with developing and approving, prior to 1 October 1981 instructions about the procedure for recomputing, in accordance with the new budget-estimating norms and prices: price lists for the construction of buildings and structures; collections of consolidated budget-estimating norms for buildings and structures, as well as for structure and types of work; collections of budget-estimating norms for expenditures for tools and for the inventory of production buildings by branch of industry and for equipment and the inventory of social and administrative buildings; collections of consolidated indicators of construction costs; prior to 1 July 1982, instructions about the procedure for recomputation in accordance with the new individual cost sheets for construction work, budget-estimating norms (or cost sheets) for the installation of equipment, and price lists and consolidated budget-estimating norms for facility budget estimates, on the basis of which settlements for the execution of construction and installing work are made;

with developing, with the participation of USSR Gosplan, USSR Minfin, USSR Goskomtsen, USSR TsSU, USSR Stroybank, USSR Gosbank, Union-republic councils of ministers and USSR ministries and agencies, and with presenting to the USSR Council of Ministers, prior to 1 October 1982, drafts of the new norms for overhead expenditures and new norms for planned accumulations in construction; and

with examining, with the participation of USSR construction ministries, USSR Minpromstroy materialov [Ministry of Construction Materials Industry], USSR Gossnab, USSR Stroybank and USSR Gosbank: recommendations of Union-republic councils of ministers on the introduction of unified prices c.i.f. the construction site for

*USSR Gosstroy Instructions of 25 February 1981, No 30-D.

#USSR Gosstroy Instructions of 18 September 1979, No VI-4695-4; of 6 February 1981 No 14-D; and of 27 February 1981, No 31-D.

settlements for the delivery of local building materials, articles and structure and, in accordance therewith, with establishing, prior to 1 October 1981, a list of the regions in which the indicated prices will be introduced; and the question of the desirability of the introduction in those regions which lack the necessary production and economic conditions for converting to settlements according to unified prices c.i.f. the construction site, of oblast base budget-estimating prices for local construction materials, articles and structure instead of zonal budget-estimated prices.

USSR Gosstroy, USSR Gosplan, USSR Minfin, USSR Goskomtsen, USSR TsSU, USSR Stroybank and USSR Gosbank are charged:

with developing and approving, prior to 1 March 1981, instructions about the procedure for recomputing, in accordance with the new prices, the budget-estimated cost of machinery and equipment for construction projects carried over to 1984 and for construction projects newly started in 1984, as well as instructions about the procedure for determining indices of change in the budget-estimated cost of machinery and equipment that are included in the budget estimate for a construction project and indices of change in the cost of machinery and equipment that are not included in the budget estimate for a construction project, which are necessary for recomputation of the ceilings on capital investment that has been allocated for acquiring machinery and equipment;* and

with examining the drafts of indices of change in the budget estimated cost of machines and equipment that are included in the budget estimate for the construction project and indices in change of cost of machines and equipment that are not included in the budget estimate for the construction project, by branch of the national economy and by branch of industry, which have been presented by USSR ministers and agencies and by Union-republic councils of ministers, and with approving them prior to 1 April 1983.

In accordance with the indicated decree, USSR ministries and agencies and Union republic councils of ministers are required:

to provide for the development and presentation, prior to 1 September 1982, to USSR Gosstroy of drafts of the appropriate indices of change in budget-estimated cost of construction and installing work and of other operations and expenditures;

to provide, prior to 1 February 1983, for recomputation of the budget-estimated cost of machinery and equipment for construction projects carried over into 1984 and construction projects newly introduced in 1984, and to present, prior to 1 March 1983, to USSR Gosstroy, USSR Gosplan, USSR Goskomtsen, USSR Minfin, USSR TsSU and USSR Stroybank drafts of indices for change in budget-estimated cost of machines and equipment that are included in the budget estimates of construction projects, and of indices of change in cost of machinery and equipment that are not included in the budget-estimates of construction projects, by branch of the national economy and by branch of industry;

to provide, prior to 1 July 1983, for recomputation, in accordance with USSR Gosstroy approved indices, of the residues of the budget-estimated cost of

*USSR Gosstroy Instructions of 27 February 1981, No 20-D.

construction and installing work and of other work and expenditures for construction projects carried over into 1984 and of construction projects newly started in 1984;

to report, by 1 January 1983, to USSR Gosplan, USSR Gosstroy, USSR Minfin, USSR Goskomsen and USSR TsSU preliminary data about change in level of budget-estimated cost of construction caused by introduction of the new budget-estimating norms and prices in accordance with the structure of the capital-investment ceilings established for 1984 and 1985 in the State Plan for Economic and Social Development of the USSR for 1981-1985. USSR Gosstroy and USSR Gosplan, with the participation of USSR Minfin, USSR Goskomsen and USSR TsSU, are charged with examining and reporting the preliminary data about change in level of the budget-estimated cost of construction caused by the introduction of the new budget-estimating norms and prices in accordance with the structure of capital investment ceilings that were established for 1984 and 1985 in the State Plan for Economic and Social Development of the USSR for 1981-1985 that have been presented by USSR ministries and agencies and Union-republic council of ministers, and with presenting, by 1 February 1983, to the USSR Council of Ministers consolidated preliminary data about this and data about the planned level of profitability of construction and installing organizations with use of the new budget-estimating norms and prices;

to provide, prior to 1 July 1983, for recomputation of facility budget estimates for the construction of facilities that were carried over into 1984 and for the construction of facilities newly started in 1984, in accordance with the new individual cost sheets for construction work, with budget-estimating norms (or cost sheets) for the installation of equipment, with consolidated budget-estimating norms, with price lists, and with the norms for overhead expenditures and plan accumulations, and also for the reapproval of these budget estimates according to the agreement with the contracting organizations; and

to provide for recomputation, according to the new budget-estimating norms and prices, and to reapprove, prior to 1 April 1983, price lists for the construction of buildings and structures, and, prior to 1 January 1983, collections of consolidated budget-estimating norms for buildings and structures and for constructional structure and types of operations, as well as collections of budget-estimating norms for expenditures for tools and inventory of production buildings by branch of industry and for the equipment and inventory of social and administrative buildings.

The USSR Council of Ministers, by the indicated decree of 4 January 1981, has obligated Union-republic councils of ministers, with the participation of construction ministries and client ministries for nonspecialized projects, and USSR client ministries and agencies, with the participation in the necessary cases of the construction ministries for specialized construction projects (including those of the linear type), to provide for:

a) the preparation, prior to 1 October 1981, with the participation of USSR Stroybank and USSR Gosbank institutions, of data about the terms and distances for hauling local building materials, articles and structure that are subject to reporting in budget-estimated prices c.i.f. the construction site's facility warehouse for these materials, articles and structure;

b) the development and approval, prior to 1 July 1982, of collections of budget-estimated prices for local building materials, articles and structure, taking into account the new wholesale prices for industrial output and rates for freight haulage;

v) the tie-in to local construction conditions of unified regional individual cost sheets for construction operations that are carried out with the use of local building materials, articles and structure; and they are to approve, prior to 1 November 1982, these cost sheets, according to the agreement with the appropriate construction ministries; and

g) the recomputation and approval: prior to 1 April 1982, of calculations for budget-estimated prices for the maintenance of railroad sidings that are not used much; and, prior to 1 November 1982, additional cost sheets and calculations for budget-estimated prices for electricity, steam, water and compressed air.

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CSO: 1821/131

CONSTRUCTION

SCIENCE'S TASKS TO IMPROVE CONSTRUCTION WORK OUTLINED

Moscow EKONOMIKA STROITEL'STVA in Russian No 8, Aug 81 (signed to press 3 Aug 81)
pp 8-9

[Article: "Within USSR Gosstroy"]

[Text] USSR Gosstroy has approved the main directions for scientific-research in the field of further improving and raising the effectiveness of organization and technology of construction operations for 1981-1985, which are cited below.

The development of scientific forecasts and of ways to improve the organization and technology of construction work.

The improvement, development and introduction of a unified system for the engineering, organizational and technological preparation for construction work, including automation of the solution of organizational and technological tasks.

The improvement and introduction of clustered, outfitted-module and expeditionary rotating-type duty and other ways and means for organizing construction work, and also the development of new and highly effective methods for constructing, rebuilding and reequipping existing industrial enterprises, including work done under complicated natural and climatic conditions.

The development and introduction of new and effective methods and forms of production-operations outfitting and of new means and methods for the delivery of building materials, articles and structure.

The improvement of calendar planning and of current planning for the execution of construction work, taking into account the rational and effective use of labor and supply and equipment resources.

The improvement of the methodology for developing designs for organizing construction, designs for performing the work, and standard flow charts for the execution of construction and installing operations.

Improvement of standard practices for setting time norms for the construction of facilities and complexes and for the rebuilding of existing industrial enterprises, taking into account the specifics of the branch of industry and of natural and climatic conditions.

The improvement of methods for determining the economic effectiveness of measures for improving the organization of construction work, as well as standard practices for the technical and economic evaluation of the solutions that are applied in designs for the organization of construction.

The development of a set of economically substantiated technical and technological and organizational requirements laid on:

design organizations—for the technical feasibility of constructional and three-dimensional layout solutions in designs that provide for reduction of construction time as well as a reduction in labor expenditure and a saving of material and energy resources during the execution of construction and installing work;

clients—for the timely and high-quality solution of questions about preparations for construction and about organizational and logistic support; and

industry—for the creation of effective materials, articles and structure and new and progressive types of construction machinery, transport means and mechanized and hand tools, and also for a rise in the degree of outfitting and factory fabrication of industrial lines, units and equipment supplied to construction projects.

Improvement of the organizational structure, the standards base, and the instructional and standard-practices documentation which regulate the activity of the industrial-design organizations of the construction ministries and agencies (the orgtekhstroys [State Trusts for the Industrialization of Construction]).

The development and introduction of new and the improvement of the technological processes and standard flow charts for doing construction and installing work that are being applied and that will provide for a reduction in labor intensiveness and in the share of expenditures for manual labor and a reduction in the prime cost and a rise in the quality of construction and installing work, including that done in accordance with the basic types of operations:

for earthmoving operations--comprehensively mechanized operating processes for the performance of work in various soils with the use of earthmoving and transporting mechanisms, continuous-action machines equipped with automation, and sets of versatile mobile machinery with a set of replaceable equipment. Methods for compacting soils and dressing trenches and excavation pits under constrained conditions. Highly effective mechanical, electrohydrodynamic, explosive, chemical and other methods and means for excavating frozen, permafrost and rocky soils;

for concrete (and reinforced-concrete) operations--comprehensively mechanized operating processes, using effective means for mechanization and tooling for the manufacture and installation of reinforcement members and formwork and for the preparation, transporting, placing, compacting, heat treatment and curing of concrete mix. Methods for performing operations that use chemical additives and plasticizers;

for masonry operations--effective operating processes and means for operational rigging (staging with change of horizon of the work area, off-the-shelf scaffolding, hoppers for the measured delivery of mortar, and so on) for the execution of masonry work with the use of brick panels and modules;

for erecting and installing operations--new operating processes for the erection of industrial, housing and social buildings and structures, including methods that involve cranes and methods that do not and methods for thrusting, raising and hoisting stories; the consolidated mechanized prefabrication of structure into outfitted modules; the erection of buildings and structures, and also of industrial equipment, by means of consolidated modules; and a rise in the precision of erection and optimization of construction and installing tolerances. Methods and means for the consolidation of constructional structure for the industrial equipment and sanitary-engineering and electrical-engineering installations;

for operations during the rebuilding and reequipping of existing industrial enterprises--effective technologies, and means for the mechanization and industrial rigging of the demolition and dismantling of buildings and structures, the reinforcement of constructional structure, the performance of concrete and reinforced-concrete operations, earthmoving work, and the removal of heaps of earth, methods for the erection and dismantling of constructional structure and of industrial equipment, and methods for transporting dismantled and assembled equipment;

for roofing operations--comprehensively mechanized processes for laying rolled roofing made of traditional and of new and effective fitted roll materials; arrangements for roll-free roofing based upon cold bituminous mastik, roofing made of prefabricated members (reinforced-concrete water-impermeable panels, panels with a covering layer, multiple-layer panels with a covering layer made of galvanized steel, aluminum, or asbestos cement); and

for finishing work--new, comprehensively mechanized methods for finishing, using effective articles and materials, highly productive machinery, mechanisms and hand tools; including industrialized methods for finishing surfaces with the use of "dry" methods based upon the application of finished sheet and roll materials, improved dry-gypsum plastering, large-dimension reinforced-concrete, wood, glass and devitrified slag glass sheets and panels; methods for finishing the surfaces of constructional structure by the mechanized method with superfine spackling and gypsum compositions; and new methods for applying painting compounds with air-free deposition.

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CSO: 1821/131

CONSTRUCTION

PROBLEMS IN GEORGIAN CONSTRUCTION COMPLETION, QUALITY DISCUSSED

[Editorial Report] Tbilisi KOMUNISTI in Georgian on 30 August page 2 carries a 1400-word article by KOMUNISTI's economics commentator E. Gaprindashvili, in which he discusses the basic problems afflicting Georgian construction in light of the ongoing conversion to the new economic mechanisms. A chronic shortcoming is "arrhythmicity," or unequal schedule through the year: too many of a year's completions are set for the fourth quarter, leading to last-minute storming. The Orel method--2-year continuous planning--should be introduced. Other mechanisms such as the Zlobin "brigade contract" method must be utilized. The author devotes considerable space to the continuing decline in construction quality, in particular housing. Gosstroy has had to stop construction on a number of projects for this reason. Part of it is due to failure to comply with building specifications (seismic standards are mentioned) and substandard structures and components. Many projects are accepted as completed even though key component items are unfinished.

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CSO: 1811/13E

METALWORKING EQUIPMENT

DEVELOPMENTS IN AND APPLICATIONS OF ROBOTICS EXPLAINED

Robots Require New Methods

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 Jun 81 p 2

[Article by I. Marchenko, director, NIIPtmash, Kramatorsk: "The Admission of the Robot Into Plants"]

[Text] Experience has shown that the introduction of robots in individual sections, on lines and in shops is a complicated and multifaceted matter that requires the solution of a whole series of problems caused by both the state of robot technology and the special production features of a branch. Investigations carried out by NIIPtmash [Scientific Research, Planning and Technological Institute of Machinery Manufacture] revealed, for example, that the equipment for the cutting of intermediate parts used in welded metal structures that has been installed in the ministry's enterprises is utilized to only 30-40 percent of capacity. The rest of the time it stands idle, with motors on, waiting until someone feeds it rolled stock, prepares the operator's position, frees the lifting and moving equipment, and carries out other auxiliary operations.

It is completely natural that although it is simple to attach industrial manipulators to these machine tools, just so they will stand idle and their efficiency will, in the final account, be extremely low. Unfortunately, we already have amassed similar "experience" in the introduction of machine tools with digital programmed control. Today their load factor in the branch does not exceed 0.56, while the shift coefficient is 1.32. These are lower figures than those achieved with general-purpose metal-cutting equipment. The main reason for this is that we have tried to squeeze a new picture into old frames, so to speak. In programmed control we have seen only one of the new methods for automating individual technological operations. Meanwhile, this is a principle that requires substantial changes in the organization and control of the entire production process. In other words, joining the new to the old cannot be done purely mechanically.

It is necessary to take this lesson into consideration when developing and introducing automatic manipulators.

In my opinion, one important prerequisite to the effective introduction of automatic manipulators is the organization of specialized sections. Unfortunately, in many enterprises with a unique and small-series type of production, the work that has been done in this area is still inadequate. It is possible to present dozens of

examples of the disconnected of sections producing monotypical articles. Even at the Novokramatorsk Machine Building Plant, where they take pride in improving their production, gear wheels (for example) are still manufactured in six shops. With such dispersion, it is difficult to talk about the use of robots.

All plants engaged in metallurgical machine building produce metal products. About 400 units of general-purpose equipment and more than 700 workers are engaged in these operations. The same thing can be said about the production of fittings. Such incoherence slows down the introduction of progressive technology.

In a word, specialization is the key to the introduction of automatic manipulators. Many enterprise leaders have already learned this. A shop for the production of standardized assemblies has been organized at the Starokramatorsk Machine Building Plant imeni Ordzhonikidze. This makes it possible to use an automated system and creates the prerequisites for the introduction of industrial robots. A roller shop has been set up on the same principle. At the Elektrostal'yazhmash plant, a shop has been created for the production of gear clutches for the branch's enterprises. There they have introduced a completely new organization of the production process that makes it possible to use 10 automatic manipulators, 2 of which will go into operation this year.

On the whole, however, the problem of both intraplant and intrabranh specialization is far from being solved. We are faced with a great deal of complicated work, related not only to reorganizing the production processes that have already been set up, but also to changing the psychology of people. This is always difficult to do. Many leaders who are accustomed to working the old way must be convinced of the necessity and importance of reorganization. The first word here belongs to the branch's headquarters--the Ministry of Heavy Machinery Manufacture. And the sooner this work begins, the better.

Automation Control Devices

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Jul 81 p 1

[Article by V. Torshkov, Leningrad: "For Complex Robots"]

[Text] The Leningrad Electromechanical Plant has completed a cycle of experimental design work for the creation of new devices for the digital programmed control of metal-cutting equipment and robot manipulators. The first models of these articles have been produced and are being tested successfully.

The work crew has 20 members. Of them, only two have a secondary education; the rest are graduates of tekhnikums and VUZ's. The high educational qualification is by no means merely a tribute to what is fashionable. It is an indispensable condition for fruitful work with complicated equipment. It is on these people, the adjusters of the digital programmed control devices, that the final results of the entire collective's labor depend.

"This equipment with its complicated--as you can see--'stuffing' arrives in our section," explains Crew Chief B. Sedykh, who is dressed in a white smock, as are his comrades. "On the whole, it is still 'dead.' Our job is to breathe a 'soul' into

it so that it will generate those signals that are necessary for the production of certain articles. In order to do this we check the power units, microelectronic circuitry and other assemblies with the help of previously formulated tests."

In the next section there is a crew of coil winders led by M. Kiseleva, who was a delegate to the 26th party congress. This collective was one of the first in the enterprise to fulfill its semiannual plan ahead of time, on 1 May, and is now competing to fulfill its annual plan by the time of the Great October Revolution holiday.

"These matrices here come to us from Mariya Georgiyevna Kiseleva and her friends," says B. Sedykh. "They have to put in place and solder 257 wires on each one. Previously we needed at least 3 days to test one such article. Now the monitoring is done automatically. As a rule, however, the matrices are free from defects, because quality is our neighbors' primary concern."

The automation of labor is typical of this shop. The crew leader proudly led me to a recently finished stand for testing the finished product. As it turns out, before it reaches the consumer, it again undergoes rigorous testing in the automatic mode, spends 16 hours in a thermal chamber at a temperature of $+40^{\circ}$, and is tested for resistance to vibration for 1.5 hours. The accrued operating time between failures is 80 hours.

B. Sedykh's crew is also competing for fulfillment of its annual plan ahead of schedule, by 7 November. In the association, about 70 work crews have also assumed such obligations. The adjusters are ahead of schedule. They are working under a unified order, exhibiting creative initiative, and approaching the work assigned them with a feeling of great responsibility.

By the way, the entire collective is working like that. For the successes it achieved in the 10th Five-Year Plan, it has been awarded the Challenge Red Banner of the CC CPSU, USSR Council of Ministers, AUCCTU and CC Komsomol. Right now, the association is confidently leading the All-Union Socialist Competition. Here is what the deputy director of the All-Union Scientific Research and Design Institute of Digital Programmed Control Systems, Candidate of Technical Sciences A. Smirnov, has to say:

"Our institute is part of the association. Right now we are working on introducing a new generation of digital programmed control devices into the production process. They are based on integrated circuits and the extensive use of microprocessors. Our goal is, in the course of this five-year plan, to replace almost completely the list of articles now being produced with devices of the next generation that are advantageous from the viewpoint of reliability and size, as well as metal-intensiveness and labor costs."

Of these innovations, this year will see the production of the first batch of industrial devices for controlling complicated robots. The development of two such devices has been completed. One will be used to control electric welding manipulators, the other to automate painting processes. From the viewpoint of their engineering content, both these problems are complicated ones. The devices are based on built-in computers with a large memory volume.

The next step is the creation of entire sections serviced by robot manipulators and transport and measuring facilities. Thus, during the 11th Five-Year Plan we will begin to move from controlling individual machine tools and robots to controlling complex technological processing complexes.

Industrial Robot Introduction Assignments

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Jul 81 p 2

[Article by B. Lebedev, deputy chief, Machine Tool Building Division, USSR Gosplan: Robots--Onto the Line"]

[Text] A new paragraph was added to the state plan for the nation this year: the ministries and departments are given the assignment not only of the production of automatic manipulators with programmed control, but also of their introduction. A substantial inventory has been created in Soviet robot technology: about 200 models of automatic manipulators have been developed, of which 40 have passed their state testing and are licensed for series production.

The prospects for the development of robot technology in the next 10 years is outlined in the integrated program of scientific research, planning and design projects for the creation and assimilation of automatic manipulators. It should be mentioned here that while we have been under the plan, USSR Gosplan and the State Committee for Science and Technology have received a large number of requests from different branches. In the future, therefore, the program will be expanded.

Work on its implementation has already begun. The first stage is assignments for the 11th Five-Year Plan. A sharp increase in the output of automatic manipulators is provided for. This year more than twice as many of them must be manufactured as were produced last year. For the five-year plan as a whole, their production will be more than sextupled in comparison with the 10th Five-Year Plan. New types of industrial robots will be created. The fact of the matter is that an absolute majority of the models already existing are intended for the machine building industry. Meanwhile, there is also an acute need for them in other branches of the national economy.

In order to insure the unconditional fulfillment of the quotas and intensify the control over the path of the work, we have determined the main machine building ministries that are responsible for the creation, production and introduction of the different types of manipulators and complexes equipped with them, as well as those responsible for fulfilling orders for articles and producing spare parts. The Ministry of the Machine Tool and Tool Building Industry has a large assignment. It has been given the task of manufacturing one-fourth of the total number of industrial robots that will be produced during the 11th Five-Year Plan. At the branch's enterprises, the production of manipulators must increase by a factor of 10 in comparison with the last five-year plan. Such a rate is explained primarily by the fact that the machine builders must provide for the automation of the most important and difficult operations in all the machine building branches.

For the creation and production of programmed control systems for automatic manipulators, the leading organization is Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems], while Minelektrotekhprom [Ministry of the

Electrical Equipment Industry] has charge of robots for welding and electrothermal and plasma processing. Essentially, almost every machine building industry is the leading organization for the production of manipulators for those branches for which it supplies equipment. For instance, Minkhimmash [Ministry of Chemical and Petroleum Machine Building] will supply robots for the chemical, cellulose and paper, oil refining and petrochemical industries, Minsel'khoz mash [Ministry of Agricultural Machine Building] Minzhivmash [Ministry of Machine Building for Animal Husbandry and Fodder Production] for agriculture, Minlegpishchemash [Ministry of Machine Building for Light and Food Industry and Household Appliances] must insure the automation of technological processes in the light, food, milk and meat industries and in commerce.

Several ministries not engaged in machine building also have assignments, such as USSR Minugleprom [Ministry of the Coal Industry] and USSR Mintsvetmet [Ministry of Nonferrous Metallurgy]. In all, 22 ministries have been enlisted for the manufacture of robots, while 34 ministries and departments will be engaged in introducing them.

Special emphasis should be given to the purposefulness of the development of industrial robots that are not simply individual models, but are indispensably correlated with each other even at the stage of planning for equipment and the creation of automatic complexes. Here is one example. The Experimental Scientific Research Institute of Metal-Cutting Machine Tools and the "Red Proletariat" plant have been given the assignment of producing an automatic manipulator of the gantry type, with a lifting capacity of 40 kilograms, to be used for machining. The next assignment for this institute and this plant is to use this manipulator as the basis for the creation of a technological complex that includes turning lathes and auxiliary equipment. This is an extremely important point, since the effect of the use of manipulators in such complexes is increasing rapidly. The same complexes are used as the basis for the organization of sections, lines and shops that operate almost completely without human participation.

A great deal of attention has been devoted to the creation of adaptive (or second-generation) robots capable of changing their behavior as the result of changing conditions. Their advantages are obvious, although to equip them it will be necessary to develop new and increase the output of existing devices--sensor, converters, locators and so on.

Since it has been specified that the rate of increase in robot production will be very high in this five-year plan, the following question naturally arises: how will the capacities for their production be developed? The appropriate assignment has been determined for each ministry. It is necessary to look for the main reserves in the existing enterprises, remove obsolete technology from the production process, and respecialize sections for the production of manipulators. The advantage in new construction is given to those branches doing a specific job that do not have any experience in building robots: Minsel'khoz mash, Minzhivmash, and Minpribor and Minelektrotekhprom, who must organize the production of the most important and complex final parts.

It is not secret that it is precisely these two ministries that are holding back the production of industrial robots. Next year USSR Gosplan will begin to stipulate the production of programmed control systems, hydraulic equipment and other

extremely important finishing parts in the state plans for the country's economic and social development.

And, finally, there is yet one more very serious and urgent problem: the acceleration of the introduction of industrial robots into the production process. The situation with regard to this was particularly alarming during the last five-year plan. It is sufficient to say that more than half the available automatic manipulators remained in warehouses and were not put to use. Almost no one monitored their introduction. This is why the state plan for this year gives the ministries and departments specific assignments for the introduction of industrial robots.

Already there are sections and even shops in some enterprises that are completely equipped with manipulators. Their experience shows that a concentration of robots makes it possible to obtain the greatest economic effect. For example, 55 manipulators for servicing automatic sections and lines consisting of 169 pieces of equipment have gone into action at one machine building plant. Labor productivity has been doubled, and in certain sections has increased by a factor of five.

On the other hand, the practice of distributing one or two robots per enterprise that still exists in some branches confirms that their use is not only unprofitable, but even causes an economic loss.

In this five-year plan, we have stipulated the organization in enterprises belonging to various ministries of 12 prototype demonstration shops, 1 automated production line and more than 60 sections equipped with automatic manipulators. Some of them have already been designed. In the "Yelgavsel'mash" plant, by 1985 there should be an integrated, automated reduction gear production line. An automated shop for the assembly of color television sets will go into operation at the Moscow Electric Bulb Plant, and as early as next year there will be the same type of shop for the production of printed-circuit cards at the "Elektron" production association. An integrated, automated, prototype demonstration shop for the production of axles is being organized at the Kama Motor Vehicle Plant. For the enterprises in their branches, these production lines will become outposts of progressive experience in the use of complexes equipped with robots.

According to the specialists' calculations, the implementation of the planned measures for the production and introduction of industrial robots will produce an economic effect of about 420 million rubles in the 11th Five-Year Plan. Their extensive use will make it possible to increase shift work and the utilization of technological equipment by at least 50 percent. Labor productivity will double or triple, on the average, the quality of the output will improve, the rhythm and overall level of production will get better, and production traumatism will be reduced. At least 70,000 workers will give up their positions to mechanical assistants.

Armenian Shortcomings Criticized

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Jul 81 p 2

[Article by N. Ordinyan, Yerevan: "A Full Load for Machine Tools"]

[Text] The Armenian SSR's Committee for People's Control has checked the status of the use of machine tools with digital programmed control in enterprises in the

republic. The check showed that, for various reasons, one-fourth of the available machine tools with digital programmed control are not in operation at the Yerevan production associations for machine tool building and equipment accessories, the "Elektron" and "Armelektromash" associations, the Yerevan Milling Machine Plant, the Leninakan Grinding Machine Plant and the Yerevan Scientific Research Institute of Mathematical Machines. The average load and shift factors of the machine tools that are in use are 0.72 and 1.37, respectively, whereas the norms are 0.85-0.9 and 1.7-1.8. Although the standard time of installation of machine tools with digital programmed control is 3 months, it took from 6 months to several years to install more than half of the ones in place.

The republic's Committee for People's Control announced penalties for the leaders of a number of associations and enterprises and approved certain measures for a radical improvement in the utilization of machine tools with digital programmed control.

Robots in Latvian Industry

Riga SOVETSKAYA LATVIYA in Russian 21 Jul 81 p 3

[Interview with Valentin Antonovich Leytan, deputy chairman, Latvian SSR Gosplan, and chairman, Republic Committee on Robot Technology, by Ye. Zarutskaya, correspondent: "Tomorrow's Technology Is Being Born Today"; date and place not given]

[Text] The modern level and tempo of industrial production dictates the necessity of making those transformations that would enable man to be freed from heavy and monotonous manual labor and make his work more creative and interesting. The efforts of scientists and specialists in this matter resulted in the creation of industrial robots. In this country as a whole, the number of robots that have replaced man in the most harmful, dangerous and difficult tasks is now close to 6,000. However, this is only the first step. We are still faced with the exertion of considerable effort to fulfill the assignment formulated in the "Basic Directions": "...to insure the extensive utilization of automatic manipulators (industrial robots), built-in automatic control systems using microprocessors and microcomputers, and the creation of automated shops and plants."

[Question] Valentin Antonovich, exactly why is it that automatic manipulators have been given such a decisive role in the transformation of the modern production process?

[Answer] Primarily because the possibilities of the industrial robot--even as scientific thought views it today--are enormous. For instance, the reserves for increasing production volume by increasing the number of workers are practically exhausted, and in the near future the problem of a shortage of working hands will become even more acute. Therefore, it is necessary to have an internal redistribution of labor resources and reduce the number of workers engaged in auxiliary operations. Actually, this is the picture we see today: a shop is saturated with automatic and semiautomatic equipment, automatic lines, machine tools with digital programmed control and processing centers. At the same time, however, alongside all these units there is a huge mass of people at work, engaged only in supplying or transporting

various articles. These are the people who are called "pushers and pullers" or "picker-uppers and setter-downers." The robotization of production will make it possible to reduce this "imbalance of forces." Besides this, in loading and unloading operations, as well as in welding, painting, stamping and other operations, it is impossible to avoid manual labor by traditional automation means. A robot, however, with his easily changed program, mobility and compactness turns out to be a reliable replacement for a man. And the scientists are still in no hurry to end the list of robot "professions," but are now working on and producing the third generation of these mechanical assistants.

However, the second generation has also advanced the horizons of its utilization considerably. Thanks to the sensor system and the robot-controlling microcomputer, robots have begun to "see" and "feel" and, consequently, adapt themselves to changes in the working process. Well, the third generation already possesses elements of an artificial intellect: the ability to evaluate a situation, model it in its own "brain" and then, by comparing the model with the assignment given it, work out the solution and give commands to the actuating members.

[Question] Doesn't all of this require a qualitatively new level in the organization of the production process itself?

[Answer] You are absolutely right. Right now, this practice has become established at some enterprises: sit by the sea watching the weather for half a month, then hurry to fulfill the plan for the rest of the month. However, calculating on hurrying things up and then slowing them down doesn't always work. A robot--no matter how much his master tries to persuade him and no matter what happens to him--will not speed up his rate of movement one iota. And idle time for such a complex and expensive machine costs a pretty penny, too. This means that it is necessary to do careful preparatory work and have strong discipline on the scale of an entire enterprise. This is even more important because when the production process is organized correctly, robot technology in and of itself carries yet another invaluable "plus": a guarantee of a high-quality product. And we will strive unceasingly to overcome the psychological barrier between the accustomed old and the unusual new.

[Question] Specifically, what has been done in the republic to develop and introduce robot technology and what are the plans for the near future in this area?

[Answer] In the last 5 years, an integrated program for the reduction of manual labor in production work was developed. It made it possible to free several thousand workers from labor-intensive, low-productivity operations. An analogous program has been thought out for the 11th Five-Year Plan. Its implementation will release about 33,000 people from manual and physically heavy labor. Industrial robots have been assigned a serious role in this.

Our republic undoubtedly has sufficient scientific and industrial potential for the thorough development and introduction of robot technology. We have only passed through the initial stage in this area. Workers at the Riga Polytechnic Institute and engineers and designers in our leading enterprises are laboring over the creation of our Latvian models of industrial robots. The results are already obvious. For instance, in several stamping sections at the Riga VEF Electrical Engineering Plant there are 15 robots in operation that were built by the plant's specialists. Manipulators are being introduced at the Riga Electrical Machinery Plant

and the "Radiotekhnika," "Kompessor" and railroad car plants. Work is being done at the Riga Agricultural Machinery Plant and "Avtoelektropribor." Complexly automated shops and sections based on robot technology will appear during this five-year plan at the Yelgava and Liyepaya Agricultural Machinery Plants and Goskomsel'khor-tekhnika's [expansion unknown] production association in Yelgava. Similar shops will also be operating at the Riga VEF Electrical Machinery Plant and the "Radio-tekhnika" association. Extensive research is being done in this field at physics and polymer mechanics institutes.

In the future we envisage the expansion of the production of industrial robots. For the meantime, however, plant directors should be more active in buying robots manufactured in other regions of the country. And those enterprises that think about this too long can simply be late.

[Question] Much depends, of course, on the initiative and farsightedness of the leaders of enterprises. In the future, in order to assist them, are there plans to set up a center that will coordinate this work in the republic?

[Answer] Yes, an interbranch design and technological center for robot technology, with experimental production facilities, is being established by order of the republic's government. It will be part of the Latvian SSR Academy of Sciences' Institute of Physics. Its specialists will develop scientific, technical and economic predictions in the field of robot technology, correlate the experience of progressive domestic and foreign enterprises, build models, pass on technical documentation for use in production, do initial setup and adjustment work, and help industry to master this new technology.

At the present time, the Committee on Robot Technology is operating, under the republic's Gosplan. On it there are representatives of party agencies, scientists from the Academy of Sciences' institutes and chief specialists from leading enterprises. On the committee's initiative, Latvian specialists have traveled to Leningrad, Minsk and Tol'yatti, where they saw many interesting things. For instance, at the Petrodvorets Watch Plant, the assembly of the most precise mechanisms--4 million wristwatches--is carried out by automatic manipulators. Robot assemblers will also soon appear in the shops of our radio production enterprises.

[Question] Thus, the ranks of industrial robots are beginning to swell. Who will maintain them?

[Answer] It is undoubtedly already necessary to think about the training of personnel right now. We need highly qualified specialists: operators, technicians, adjusters. And, looking ahead, the plants must now send their scholarship students to VUZ's and tekhnikums throughout the country, such as the Moscow Higher Technical School imeni N.E. Bauman and the Leningrad and Riga Polytechnic Institutes. Courses for the training of these specialists can also be organized at the large enterprises.

In the process of the robotization of production there will, of course, arise many problems. They must be solved with the total efforts and that degree of responsibility to which the decisions of the 26th party congress obligate us.

Robot Welder in Kiev

Moscow IZVESTIYA in Russian 24 Jul 81 p 2

[Article by S. Tsikora, special correspondent: "A Robot Welder"]

[Text] The gold medal winner at the Plovdiv International Fair—a robot complex capable of performing complicated welding operations—has been delivered to Kiev and set up in a shop at the Leninskaya Kuznitsa Shipbuilding Plant. It owes its existence to socialist integration: it was built by Soviet and Bulgarian specialists.

It is paradoxical that more cyberneticists and mechanics than welders took part in the development work. They designed their robot so that its technical functions can be expanded considerably without making any fundamental changes in its design.

"This latter quality, which should be called intelligent universalism, is particularly important," said Professor F. Kiselevskiy, deputy leader of the development of the complex on the Soviet side. "This quality of our robot is very impressive to the production workers, for whom the specific concerns of the shop are, quite naturally, in first place."

There are many problems in modern shops and there are very likely no enterprises where welders are not needed. It is particularly difficult for plants whose output is produced in small and medium-sized series, with frequent reorganization of the production process. Shipbuilding is one of these branches. Absolutely no progress can be made without the use of welding. It is not surprising, therefore, that the robot complex is beginning its working biography in a shop at a shipbuilding plant.

"We will begin with relatively simple operations so as—as the scientists say—not to ruin the idea," said the plant's chief welder, Yu. Mosenkis. "Later, when we have gained some experience and additional equipment appears, we are planning to use the complex to weld hull sections for ships."

The mechanization and automation of welding work proved to be an extraordinarily difficult thing to do. Although thousands of robots are now at work at enterprises in various countries and a considerable amount of experience in designing them has been accumulated, the requirements of industry outstrip significantly the ideas of the scientists and developers.

The Soviet-Bulgarian robot technical complex mechanizes the use of arc welding, the most widely used method for joining metals together. The robot carries out its duties extremely accurately and its movement even have some inherent elegance. The complex functions like a man's two hands. An article is placed on one of two manipulating tables that are capable of tilting and turning. A gantry with a torch manipulator moves above them. The movements of the torch and the table are coordinated so that the article is always in the position that is most convenient for welding.

"The creation of an original robot in such a short period of time was predestined by the participation of prominent specialists and the clearcut organization of our

work with our Bulgarian colleagues," said Professor F. Kiselevskiy. "The Soviet investigators were led by Academician B.Ye. Paton, a well-known leader in the field of the science of welding, while the Bulgarians worked under the direction of Angel Angelov, a talented scientist who is first deputy chairman of the Bulgarian People's Republic's Committee on Science and Technical Progress and, at the same time, director of the Institute of Technical Cybernetics. With the help of the Soviets, the Bulgarian specialists developed and built the entire mechanical part of the robot and the welding equipment. The Soviet scientists, together with their Bulgarian colleagues, worked on the control system, the software system and the algorithms."

The robot technical complex for arc welding is still being improved. Although even now it independently selects the most convenient position for an article to be welded, in the near future its intellectual capabilities will be enlarged considerably. It will be able to take into consideration such factors as random deviation of the elements being welded from the given position, a change in the geometry of the splicing of edges and other factors, and will also be able to select the best way to operate. In other words, it will be able to adjust to the production situation.

Robot Development Policies Criticized

Moscow PRAVDA in Russian 7 Aug 81 p 2

[Article by G. Staroverov, candidate of technical sciences, Noril'sk, Krasnoyarskiy Kray: "What Can Robots Do?"]

[Text] Machine building is the basic producer and consumer of automatic manipulators (industrial robots). Their popularity is indisputable. However, can we judge the technical level at an enterprise according to the number of industrial robot "work crews" it has? There is no clearcut answer to this.

I will explain this idea. A robot is called upon to replace a man in various sections and to do the work even better. However, other automation and mechanization facilities are already being created for this purpose. At the same time, there frequently remain "white spots," or operations requiring the participation of a man. Among them are: the placement and removal of articles in machine tools and presses and painting, welding and loading and transporting work. Manipulators need to be placed in these positions instead of men. Then they will be a little bit better for both man and robots.

A frequently excessive need for robots is of itself an indicator of an irrational approach to automation as a whole. When, for example, VNIImetmash [All-Union Scientific Research, Planning and Design Institute of Metallurgical Machinery] proposes to manufacture gear wheels by hot knurling, having turned away from labor-intensive and expensive gear cutting on machine tools, when a single machining center that knows how to perform several operations at the same time is used instead of dozens of different machine tools, when it is necessary to have an electrical field in operation while painting--all of this immediately eliminates a mass of equipment, and instead of whole "crews" of robots, only one type or another is needed.

The reader should not think that the author of this article is an "enemy" of manipulators. He is totally for their creation. The main thing is that there should be a system--a unified program--for the development of robots.

Right now, automatic manipulators frequently copy the movements of man or the old devices they are replacing. In connection with this, here and there we forget that the principle of mechanical copying of operations is methodologically the most primitive one. In his efforts to fly, man long ago attempted to copy the flapping of a bird's wings. Such "flapping of wings" is often encountered in robot building, and progress in this area--despite its popularity--leaves much to be desired.

The search for promising areas in automation is unarguably difficult. Therefore, it is absolutely necessary to set up a system for the testing and screening of decisions that are unsuccessful in concept. The following example illustrates the urgency of this. At one time Minstankoprom [Ministry of the Machine Tool and Tool Building Industry] and several scientific research institutes were fighting for the creation of machine tools with digital programmed control, the assignments for which were to be transmitted from a single central computer operating in an alternate switching mode. This did not produce a great effect, however, since expensive sections were being created even as cheaper minicomputers and microcomputer prototypes were appearing; these were capable of storing the required set of standard programs in their memory and modifying them quickly and also had the advantage of small size. The advisability of the extensive utilization of microcomputers is now generally accepted.

One would think that it is now time to direct automation not at existing technological processes and equipment, but--obligatorily--at the prospects for their development. In the decisions that are being made it is important to take into consideration the opinions of a broad circle of specialists, since orientation on separate institutes sometimes proves to be a one-sided matter. A discussion of the problems can be organized through scientific and technical periodicals, where (incidentally) there are now numerous descriptions of specific automation devices but no articles about comparative analyses of variants of these devices.

Is it possibly advisable to introduce a competitive system for the solution of automation problems, as is now done with architecture? If such were the case we would see fewer robots of the type of the UFR-11 manipulator, which was manufactured by the Dmitrov Experimental Mechanical Plant. It is intended to carry out the extremely simple operations involved in loading a machine tool with blanks, but is larger than the actual machine tool. The Experimental Scientific Research Institute of Metal-Cutting Machine Tools "introduced" a five-element code for programs in machine tools with digital programmed control even as a more promising eight-element code was appearing. The latter has become the international standard. We in machine building, with our five-element code, are now experiencing additional difficulties. What does this indicate?

In any case, the development of automation facilities must be preceded by a comparative analysis of the possible solutions and substantiation of the prospects of the variant that is chosen. This appears to be only natural, but in practice it is not adhered to for some reason, which sometimes leads to fundamentally obsolete developments. How can this be? On the basis of the achievements of science and technology it is certainly feasible to set up a permanently active system for determining the prospects for the development of technological processes and insuring their automation by expanding the production and utilization of automatic manipulators.

What is a robot? Actually, a sewing machine performs for man operations that are more complex than those carried out by many robots. However, it has not had the

honor of being called a robot bestowed on it. They say, for instance, that you cannot compare a parrot with anything made by man. A machine knows how to do one set of operations, while a robot is "intelligent" because of its electronics and can be taught many movements.

Finally, from the viewpoint of finances and obtaining other advantages, it is profitable for developers to represent their work to everyone as something new and unique. However, this pursuit of originality may prove to be too expensive for the national economy. Even in robot building itself, it has become more prestigious to talk about "artificial intellect." Unfortunately, this is being done while the plants urgently require that intellect be manifested primarily in the creation of simpler, but reliable and cheap automation equipment.

Right now it is extremely important to plan the basic, general direction of automation that is suitable for all branches and to implement unswervingly a unified technical policy. How do we begin doing this? With standardization and the modular unit design principle. Automation on the basis of programmed equipment control can go in this direction. Robot building is a component part of it and has analogous technical solutions, for the most part.

National economic resources are not unlimited, and it is important to curtail the zigzags along the path of the integrated automation of production as much as possible. It is necessary to increase the degree of responsibility for decisions that are made. The extensive and--even better--competitive discussion of problems will at least make it possible to find out who sees the prospects most clearly.

In any case, the status and importance of the automation of production makes it necessary to have a system of interdepartmental and interbranch coordination of developments that also carries out management functions. It obviously makes sense to combine this with purposeful resource support of work in this area. It is even more important to provide a unified technical policy in this area.

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12 Nov. 1981